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CONTENTS

LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under :– Diseases Caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity] ...	903–914
Anthrax	903
Tuberculosis	904
Corynebacterium equi	910
Salmonella infection	911
Brucella infection	912
DISEASES CAUSED BY PROTOZOAN PARASITES	915–920
Amoebiasis	915
Blackhead of Turkeys	916
Trypanosomiasis	916
Coccidiosis	918
Piroplasmosis	919
DISEASES CAUSED BY VIRUSES ...	920–932
Foot and mouth disease	922
Rinderpest	925
Equine encephalomyelitis	925
Rabies	927
Avian virus diseases	929
PARASITES IN RELATION TO DISEASE [ARTHROPODS]	932–933
PARASITES IN RELATION TO DISEASE [HELMINTHS]	933–936
IMMUNITY [including Allergic and Serological Diagnosis] ...	936–940
Tuberculin test	936
Serological tests	938
DISEASES, GENERAL [General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms]	940–954
Tropical diseases	940
Haemoglobinuria	945
Leucaemia	950
NUTRITION IN RELATION TO DISEASE [Articles placed in the section "Diseases, General" may also contain references to nutritional factors] ...	954–956
Osteodystrophia	954
Vitamin deficiency	955
THERAPEUTICS	957–963
Mastitis	957
Trypanosomiasis	959
Ox Warbles	960
Fly Repellents	961
Helminthiasis	962
POISONS AND POISONING ...	963–965
Selenium	963
Cod liver oil	965
PHYSIOLOGY	966–968
TECHNIQUE AND APPARATUS ...	968–971
MISCELLANEOUS	971–974
REPORTS	974–981
Great Britain	974
Eire	976
India	979
Holland	980
Angola	980
Indo-China	981
U.S.A.	981
BOOK REVIEWS	982

INDEX TO AUTHORS

Abusalimov, N. S. See Markov, A. A., et al., jt. authors, 919.
Adler, S., Theodor, O., & Witenberg, G., 917.
Aires, A. A., 980.
—, & Lima do Sacramento Pratas, A., 971.
Ammann, K., 971.
An. Serv. vet. Pec. Angola, 1939, 980.
Andersen, M., 923.
Arboleda, C. A. C., 962.
Arch. Inst. Pasteur Indo-Chine, 981.

Bader, R. See Habs, H., jt. author, 957.
Bailly, J. See Remlinger, P., jt. author, 928, *bis*.
Balykin, M. T. See Gusev, V. F., et al., jt. authors, 917.
Bardelli, F., & Menzani, C., 916.
Bawa, H. S., 934.
Bayrou, M. See Malbrant, R., et al., jt. authors, 915.
Becker, E. R., & Waters, P. C., 918.
Beckett, F., 911.
Beckh, A., 960.
Berkson, J., Magath, T. B., & Hurn, M., 970.
Besredka, A., & Salamon, E., 969.
Bevan, L. E. W., 959.
Bhattacharjee, J., 932.
Bird, H. R., Oleson, J. J., Elvehjem, C. A., Hart, E. B., & Halpin, J. G., 955.
Bloch, F. See Rist, N., et al., jt. authors, 909.
Bonét-Maury, P., & Olivier, H. R., 909.
Bovarnick, M. See MacDowell, E. C., et al., jt. authors, 950.
Bovet, D. See Brumpt, E., et al., jt. authors, 960.
Brand, E., Cahill, G. F., & Kassell, B., 948.
van den Branden, F., 959.
Brandly, C. A., 930.
—, & Dunlap, G. L., 930.
Breitenstein, 947.
Bridré, J., & Martin, L. A., 926.
Brown, H. C., 939.
Brumpt, E., Bovét, D., & Brumpt, L., 960.
Brumpt, L. See Brumpt, E., et al., jt. authors, 960.
Buck, J. M. See Cotton, W. E., et al., jt. authors, 912.
Buenò, P., 947.
Bull. Hlth Org. L.o.N., 939.
Bywater, H. E., 975.

Cabasso, V., Schaefer, W., & Harpoth, H., 908.
Cahill, G. F. See Brand, E., et al., jt. authors, 948.
Calder, R. M., 938.
Cameron, H. S., & McOmie, W. A., 938.
Cardassis, J., 954.
Cashell, G. T. W., & Kon, S. K., 955.
Caughley, F. G. See White, P., jt. author, 948.
Cernovsky, J., 922.
Chabaud, A., 960.
Chaddock, T. T., 945.
Charipper, H. A. See Kleinberg, W., et al., jt. authors, 963.
Cheredkov, V., 972.
Chick, H., Macrae, T. F., & Worden, A. N., 956.
—, el Sadr, M. M., & Worden, A. N., 956.
Clausen, N. M. See Longley, B. J., et al., jt. authors, 969.
Clayson, C., 909.
Cohn, M. L. See Corper, H. J., jt. author, 937.
Cordier, G., 924.
Coronel, A. B. See Topacio, T., et al., jt. authors, 927.
Corper, H. J., & Cohn, M. L., 937.
Cotton, W. E., Buck, J. M., & Smith, H. E., 912.
Courtade, R. See Urbain, A., et al., jt. authors, 937.
Craig, J. F., & Ratter, A., 947.
Crocco, G., 927.

Dahlberg, G., 982.
Dahmen, 971.
D'Ath, E. F., 949.
Datta, S. C. A., 935.
Daubney, R., 940.
Davesne, 962.
Day, F. T., 944.
Dechambre, E. See Urbain, A., et al., jt. authors, 906.
DeVine, B., 975.
Dibben, H. C., 979.
Dimock, E. R., 981.
Dobberstein, J., & Seifried, O., 949.
von Düring, W., & Herms, H., 920.
Dunlap, G. L. See Brandly, C. A., jt. author, 930.
Dzasokhov, G. S. See Markov, A. A., et al., jt. authors, 919.

Eagleson, C., 961.
Eilmann, 950.
Eire. Rep. Dis. Anim., 1938-39, 976.
—. Rep. vet. Coll. Ire., 1938-39, 976.
—. Rep. vet. Res. Lab., 1938-39, 976.
Elvehjem, C. A. See Bird, H. R., et al., jt. authors, 955.
Emmel, M. W., 952.
Endrejat, E., 971.
Evans, C. A. See Green, R. G., jt. authors, 928.
Evans, F. L., 940.

Farrell, M. A. See Hechler, M. C., jt. author, 903.
Filmer, J. F., 970.
Finch, R., 975.
Flight, C. H., 948.
Florio, 946.
Fontaine, P., 949.
Francis, T., Jr. See Magill, T. P., jt. author, 931.
Freyer, H. J., 960.
Frye, W. W. See Meleney, H. E., et al., jt. authors, 915.

Gambles, R. M., 943.
Gavrilov, M., & Nijs, J., 970.
Geertsema, G., 945.
Geiger, W., 929.
Gerlach, F., 923.
Gerstner, R., 957.
Glover, R. E., 929.
Glukhovtsev, G. D., 904.
Gordon, A. S. See Kleinberg, W., et al., jt. authors, 963.
Gortner, R. A., Jr. See Lewis, H. B., et al., jt. authors, 963.
Graham, J. D. P., 967.
Graves, R. R. See Swett, W. W., et al., jt. authors, 949.
Great Britain. Rep. colon. adv. Comm., 1938-39, 974.
—. Rep. Hlth City Manchr., 1938, 975.
—. Rep. Hlth Serv. West Ham, 1937, 975.
—. Rep. med. Offr Hlth Preston, 1938, 975.
—. Rep. med. Offr Hlth Salford, 1937, 975.
—. Rep. med. Offr Hlth Salford, 1938, 975.
—. Rep. publ. Hlth Dep. Cardiff, 1938, 975.
—. Rep. Lond. Sch. Hyg., 1937-38, 977.
—. Rep. Mkts Comm. Manchr., 1939, 975.
—. Rep. vet. Offr Bgham, 1939, 975,
—. Rep. vet. Offr Newcastle, 1938, 975.
Green, R. G., & Evans, C. A., 928.
Groulade, 962.
Gusev, V. F., Balykin, M. T., Mel'nikov, D. D., & Terent'ev, P. S., 917.

Haber, P., 929, 930.
Habs, H., & Bader, R., 957.
Haines, R. B. See Lea, D. E., jt. author, 970.
Haldane, J. B. S., 920.
Hale, W. M. See Porter, J. R., jt. author, 957.
Halpin, J. G. See Bird, H. R., et al., jt. authors, 955.
Hamilton, C. M., & Sawyer, C. E., 953.
Hamon, V. See Rist, N., et al., jt. authors, 909.
Hardenbergh, J. G., & Mills, A. M., 913.
Harford, C. G. See Olitsky, P. K., jt. author, 925.
Harpøth, H., 908.
—. See also Cabasso, V., et al., jt. authors, 908.
Hart, E. B. See Bird, H. R., et al., jt. authors, 955.
Hechler, M. C., & Farrell, M. A., 903.
Hegner, R., 919.
Henninger, R. See Zeller, H., jt. author, 913.
Herms, H. See von Düring, W., jt. author, 920.
Hobmaier, A., & Hobmaier, M., 933.
Hobmaier, M. See Hobmaier, A., jt. author, 933.
Hobson, F. C. G., & Witts, L. J., 954.
Holland. Rep. St. Serum Inst., 1938, 979.
Holmberg, J., 960.
Hornus, G. J. P., 931.
Hughes, J. H. M., 975.
Hurn, M. See Berkson, J., et al., jt. authors, 970.

India. Rep. Army vet. Serv., 1938-39, 979.
—. Rep. Pasteur Inst., Coonoor, 1938, 979.
Ioanid, V. See Nitzescu, I. I., jt. author, 955, 956.
Ipsen, J., & Rostock, O., 939.

Jakimov. See Yakimov.
Jänel, H., 965.
Jármai, K., 952.
Jensen, E. F., 924.
Jerlov, S., 923.
Jespersen, K. W. See Matthiesen, C. C., jt. author, 937.
Jöhnk, M., 904.
Johnstone, W. K., 975.
Jørgensen, M., 936.
Joyeux, C., & Sautet, J., 932.
Jullien, J., 914.

Kabat, E. A., 953.
Kassell, B. See Brand, E., et al., jt. authors, 948.
Kelser, R. A., 942.
Kleinberg, W., Gordon, A. S., & Charipper, H. A., 963.
de Kock, G., 940.
Kohane, O., 969.
Kon, S. K. See Cashell, G. T. W., jt. author, 955.
Korenchevsky, V., & Ross, M. A., 968.
Kovács, G., 954.
Krembs, J., 944.
Kudinov, A. F., 933.
Kurchatov, V. I. See Markov, A. A., jt. author, 919.
—. See also Markov, A. A., et al., jt. authors, 919, *bis*.

Laanes, T. See MacDowell, E. C., et al., jt. authors, 950.
Lagodsby, H., 917.
Langner, H., 922.
Latteur, J. P., 935.
Lea, D. E., & Haines, R. B., 970.

Leathers, W. S. See Meleney, H. E., et al., jt. authors, 915.
Levaditi, C., 958.
Lewis, H. B., Schultz, J., & Gortner, R. A., Jr., 963.
Liechtenstein, G. P., 912.
Lima do Sacramento Pratas, A. See Aires, A. A., jt. author, 971.
Lisbonne, M., 914.
Longley, B. J., Clausen, N. M., & Tatum, A. L., 969.
Luria, S. 920.

McCulloch, E. C. See St. John, J. L., et al., jt. authors, 964.
Macrae, T. F. See Chick, H., et al., jt. authors, 956.
McDonald, J. G., 966.
MacDowell, E. C., 950.
—, Potter, J. S., Richter, M. N., Victor, J., Bovarnick, M., Taylor, M. J., Ward, E. N., Laanes, T., & Wintersteiner, M. P., 950.
McEwen, A. D., 913.
Machul'skiĭ, S. N. See Yakimov, V. L., et al., jt. authors, 918.
Macindoe, R. H. F. See McLennan, G. C., et al., jt. authors, 947.
McKenna, C. T. See McLennan, G. C., et al., jt. authors, 947.
McLennan, G. C., Macindoe, R. H. F., & McKenna, C. T., 947.
McOmie, W. A. See Cameron, H. S., jt. author, 938.
Magath, T. B. See Berkson, J., et al., jt. authors, 970.
Magill, T. P., & Francis, T., Jr., 931.
Magnusson, H., 910.
Mahal, H. S., 962.
Malbrant, R., Bayrou, M., & Rapin, P., 915.
Markov, A. A., Abusalimov, N. S., & Kurchatov, V. I., 919.
—, & Kurchatov, V. I., 919.
—, —, & Dzasokhov, G. S., 919.
Martin, L. A. See Bridré, J., jt. author, 926.
Matthews, C. A. See Swett, W. W., et al., jt. authors, 949.
Matthiesen, C. C., & Jespersen, K. W., 937.
Meleney, H. E., Frye, W. W., & Leathers, W. S., 915.
Mellanby, E., 974.
Mel'nikov, D. D. See Gusev, V. F., et al., jt. authors, 917.
Menzani, C. See Bardelli, F., jt. author, 916.
Miègeville, J., & Zottner, G., 928.
Miller, W. T., & Williams, K. T., 964.
Mills, A. M. See Hardenbergh, J. G., jt. author, 913.
Minett, F. C., 943.
Mulligan, H. W., 979.
Myburgh, S. See Quin, J. I., et al., jt. authors, 967.

Neitz, W. O., 958, *bis*.
Nelson, J. B. See Ten Broeck, C., jt. author, 948.
Nevot, A. See Urbain, A., et al., jt. authors, 937.
Nicolaus, W., 965.
Nijs, J. See Gavrilov, W., jt. author, 970.
Nitzescu, I. I., & Ioanid, V., 955, 956.
Nobrega, P. See Reis, J., jt. author, 935.
Nouvel, J. See Urbain, A., jt. author, 909.
—. See also Urbain, A., et al., jt. authors, 906.
Nusser, I., 938.

Olafson, P., 911.
Oleson, J. J. See Bird, H. R., et al., jt. authors, 955.
Olivier, H. R. See Bonét-Maury, P., jt. author, 909.
Olitsky, P. K., & Harford, C. G., 925.
Oppel, E., 923.
Oppermann, T., 921.

Piening, C., 911.
Pires, F. A., 916.
Platen, J., 905.
Porter, J. R., & Hale, W. M., 957.
Potter, J. S. See Victor, J., jt. author, 951.
—. See also MacDowell, E. C., et al., jt. authors, 950.
Prag. tierärztl. Arch., 922.
Pyl, G., 921.
Pyman, F. L., 959.

Quin, J. I., & van der Wath, J. G., 967.
—, —, & Myburgh, S., 967.

Randall, R., 926.
Rapin, P. See Malbrant, R., et al., jt. authors, 915.
Ratter, A. See Craig, J. F., jt. author, 947.
Reis, J., & Nobrega, P., 935.
Remlinger, P., & Bailly, J., 928, *bis*.
Revo, M. V., 904.
Richter, M. N. See MacDowell, E. C., et al., jt. authors, 950.
Rimington, C., 966.
Rist, N., Bloch, F., & Hamon, V., 909.
Robles, M. M., 927.
—. See also Topacio, T., et al., jt. authors, 927.
Röhrer, H., 904.
Ross, M. A. See Korenchevsky, V., jt. author, 968.
Rostock, O. See Ipsen, J., jt. author, 939.
le Roux, G., 925.
Rudd, J. A., 920.
Ruys, A. C., 906.

el Sadr, M. M. See Chick, H., et al., jt. authors, 956.
St. John, J. L., McCulloch, E. C., Sotola, J., & Todhunter, E. N., 964.
Salafranca, E. See Topacio, T., et al., jt. authors, 927.
Salamon, E. See Besredka, A., jt. author, 969.
Sautet, J. See Joyeux, C., jt. author, 932.
Sawyer, C. E. See Hamilton, C. M., jt. author, 953.
van den Schaaf, A., 936.
Schaefer, W. See Cabasso, V., et al., jt. authors, 908.
Scheer, C., 974.
Schmid, F., 934.
Schmidt, W., 938.
Schoop, G., & Stolz, A., 958.
Schultz, J. See Lewis, H. B., et al., jt. authors, 963.
Schumacher, A., 968.
Schwartz, E., 932.
Seifried, O. See Dobberstein, J., jt. author, 949.
Sen, S. K., 961.
Senyushkina, V. P. See Yakimov, V. L., et al., jt. authors, 918.
Shahi, H. B., 943.
Shyrock, E. H., 969.
Silberberg, M., & Silberberg, R., 967.
Silberberg, R. See Silberberg, M., jt. author, 967.
Smith, H. E. See Cotton, W. E., et al., jt. authors, 912.
Smith, M. L., 939.
Soni, B. N., 932.
Sordelli, A., 939.
Sotola, J. See St. John, J. L., et al., jt. authors, 964.
Spalina, 947.
Srivastava, H. D., 933, 935, *bis*.
Stamatescu, S., & Sturdza, L., 903.
Stamatin, L. See Stamatin, N., jt. author, 907.
Stamatin, N., & Stamatin, L., 907.
Stewart, H. L. See Tocantins, L. M., jt. author, 953.
Stewart, S. E., 914.
Stolz, A. See Schoop, G., jt. author, 958.
Stone, W. S., & Thompson, A. T., 969.
Streng, K. O., 908.
Stroh, G., 924.
Sturdza, L. See Stamatescu, S., jt. author, 903.
Swartzwelder, J. C., 915.
Swett, W. W., Matthews, C. A., & Graves, R. R., 949.

Tatum, A. L. See Longley, B. J., et al., jt. authors, 969.
Taylor, M. J. See MacDowell, E. C., et al., jt. authors, 950.
Taylor, W., 934.
Ten Broeck, C., & Nelson, J. B., 948.
Terent'ev, P. S. See Gusev, V. F., et al., jt. authors, 917.
Terroine, E. F., 982.
Theodor, O. See Adler, S., et al., jt. authors, 917.
Thiéry, J. P. See Urbain, A., et al., jt. authors, 937.
Thijn, J. W., 945.
Thomas, A. D. See Thorburn, J. A., jt. author, 905.
Thompson, A. T. See Stone, W. S., jt. author, 969.
Thomsen, K. G., 907.
Thorburn, J. A., & Thomas, A. D., 905.
Thornton, H., 975.
Thygesen, J. P. N., 923.
Tocantins, L. M., & Stewart, H. L., 953.
Todhunter, E. N. See St. John, J. L., et al., jt. authors, 964.
Topacio, T., Robles, M. M., Coronel, A. B., & Salafranca, E., 927.
Toussieng, E., 924.

U.S.A. Rep. Commr. Anim., Conn., 1938, 981.
Urbain, A., 906.
—, Dechambre, E., & Nouvel, J., 906.
—, & Nouvel, J., 909.
—, Thiéry, J. P., Nevot, A., & Courtade, R., 937.

Victor, J., & Potter, J. S., 951.
—. See also MacDowell, E. C., et al., jt. authors, 950.
Violle, H., 920.
Viridén, P., 938.
Vittoz, R., 931.
Vogler, G., 968.
Voloskov, P. A., 972.
Vzorova. See Zaprudnyĭ, jt. author, 904.

von Wajgiel, E. R., 963.
Ward, E. N. See MacDowell, E. C., et al., jt. authors, 950.
Waters, D. F., 954.
Waters, P. C. See Becker, E. R., jt. author, 918.
van der Wath, J. G. See Quin, J. I., jt. author, 967.
—. See also Quin, J. I., et al., jt. authors, 967.
Weed, A., 962.
Weikl, 905.
Weisgerber, F., 972.
White, P., & Caughley, F. G., 948.
Wilcocks, C., 907.
Williams, K. T. See Miller, W. T., jt. author, 964.
Wintersteiner, M. P. See MacDowell, E. C., et al., jt. authors, 950.
Witenberg, G. See Adler, S., et al., jt. authors, 917.
Witts, L. J. See Hobson, F. C. G., jt. author, 954.
Witzigmann, J., 946.
Worden, A. N. See Chick, H., et al., jt. authors, 956., *bis*.

Yakimov, V. L., Senyushkina, V. P., & Machul'skiĭ, S. N., 918.

Zaprudnyĭ, & Vzorova, 904.
Zeller, H., & Henninger, R., 913.
Zottner, G. See Miègeville, J., jt. author, 928.
Zumbro, P. B., 973.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin.* Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin.*

INDEX VETERINARIUS.

See notice on page 3 of cover.

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Vol. 10.] **December, 1940.** [No. 12.

DISEASES CAUSED BY BACTERIA AND FUNGI

HECHLER, M. Catherine, & FARRELL, M. A. (1938). **A Study of Hemolytic Streptococci with Reference to the Correlation Between their Group Specific Substances and Biochemical Characteristics.**—*J. infect. Dis.* **63.** 225–231. 1 table. [13 refs.]

Forty-two strains of haemolytic streptococci from human and animal sources, including 9 from bovine udders, 3 from other organs of cattle, 3 from milk and 1 from a horse with strangles, were examined. The Lancefield precipitin test and a fairly wide series of biochemical tests were carried out.

Except for one strain which was isolated from a cow's udder, the nine group A strains were of human origin.

Of the twelve strains of bovine origin only three gave positive precipitin tests with group B antiserum. Five of the strains, including two associated with mastitis, gave strong reactions with group C antiserum and less marked reactions with group B. One strain reacted with group A and three strains did not react with any of the antisera used (groups A to G).

The biochemical reactions showed general agreement within group A. The biochemical reactions of the three group B strains were very variable. The biochemical and cultural reactions of the fourteen group C strains were fairly uniform, and six of the cultures fermented starch ; only one other strain, a group B, had this property.

Four strains isolated from cheese all gave specific reactions with group D sera, and one of the strains hydrolysed sodium hippurate. Two group E strains were isolated from certified milk. Three group F and three group G strains were examined. Three bovine strains did not fall into any serological group. The correlation between the commonly accepted biochemical tests and the serological groupings was not definite.—JOHN FRANCIS.

STAMATESCU, S., & STURDZA, L. (1940). Variantes " R " et " S " chez le *Bacillus anthracis* et leurs relations avec la virulence du germe. [**R and S Variants of** *B. anthracis* **and their Relation to its Virulence**].—*C. R. Soc. Biol. Paris.* **133.** 510–512.

The authors carried out a detailed study of seven cultures of *B. anthracis*, four of which originated from blood of human cases and two from malignant pustules, while the remaining one was a laboratory stock culture, several years

old. They were able to distinguish two forms of the R type and three of the S type and give the characteristic features of each together with their pathogenicity for mice. The R type, the form which appeared in recently isolated cultures, was more virulent than the S type. The latter were, however, possessed of greater amounts of capsular material.—J. R. LAWSON.

ZAPRUDNYĬ, & VZOROVA. (1939). O primenenii sibireyazvennoĭ glyukozidnoĭ vaktsiny, prigotovlennoĭ na otechestvennom saponine. [**On the Use of Anti-Anthrax Glucoside Vaccine Prepared with Russian Saponin**].—*Sovyet. Vet.* No. 7. pp. 39–40.

A report on experiences with a glucoside anti-anthrax vaccine prepared with Russian instead of imported saponin. The vaccine, when tested on 800 horses and 102 head of cattle, gave results equal to those given by vaccines prepared with imported saponin.—E. MARTIN.

REVO, M. V. (1939). K revizii izgotovleniya pretsipitiruyushcheĭ sibireyazvennoĭ syvorotki. [**Need for Revision of Present Methods in the Preparation of Anti-Anthrax Precipitating Sera**].—*Sovyet. Vet.* No. 7. pp. 38–39.

Attention is drawn to the need for a careful selection of the *Bacillus anthracis* strains used in the preparation of anti-anthrax precipitating sera. Some of these contain antibodies against somatic (polysaccharide) antigens as well as against capsular antigens, while others give reactions with the polysaccharide antigen only. Such sera are unsatisfactory as they reveal only one of the specific antigenic fractions in the material to be tested.—E. MARTIN.

GLUKHOVTSEV, G. D. (1939). O titratsii protivosibireyazvennoĭ syvorotki sporovoĭ formoĭ B. anthracis. [**Titration of Anti-Anthrax Serum with Sporulating *Bacillus anthracis***].—*Sovyet. Vet.* No. 6. pp. 15–17.

Sporulating *B. anthracis* preserved in glycerin and diluted with physiological saline was used for the titration of antisera. The sporulating organisms were found to be more reliable and sensitive than the vegetative form.—E. MARTIN.

RÖHRER, H. (1939). Beitrag zur exogen entstandenen Vulvatuberkulose. [**Vulvar Tuberculosis of External Origin in Cattle**].—*Tierärztl. Mitt.* **20.** 713–716. [10 refs.]

Of 10,200 cows examined at Cologne abattoir, four showed primary TB. of the vulva. A table is provided giving details of 11 cases of vulvar TB.; six of these are considered as isolated primary lesions, four as cases of reinfection and one as a primary lesion causing generalization. Lymphatic drainage from the vulva is by the supramammary, internal iliac and precrural lymph nodes, and it is suggested that the meat inspection regulations should be altered to conform to this fact so that these nodes are examined if vulvar TB. is present. Removal of affected lymph nodes is considered sufficient action by the inspector, since the afferent lymphatic vessels for the most part traverse only the subcutaneous and pelvic connective tissue and do not pass through the musculature of the quarter. —E. G. WHITE.

JÖHNK, M. (1940). Ueber knotige-schwielige Verkäsungen und Tuberkulose der Unterhaut des Rindes. [**Nodular Caseation and Tuberculosis of the Skin in Cattle**].—*Berl. Münch. tierärztl. Wschr.* March 15th. 121–126.

Nodular caseous lesions in the subcutaneous tissues were found in 74 cattle imported from Ireland. The lesions were usually confined to the limbs, being more

common in those sites exposed to mechanical injury. Affected animals were for the most part Shorthorns, but a few were Herefords. No lesions were seen in animals of the Kerry and Aberdeen Angus breeds. In the smaller lesions there was a yellowish caseous centre which was often calcified and showed a marked resemblance to tuberculous lesions. Large ones showed a thick connective tissue capsule and contained a pus-like material; these nodules resembled abscesses rather than tuberculous lesions. Ulceration through the overlying skin was observed in three animals. The laboratories to which material was sent reported that the numerous acid-fast organisms found were not tubercle bacilli. Several of the affected cattle had reacted to the tuberculin test prior to slaughter, but no evidence of TB. was found P.M.

Four cases of true subcutaneous TB. in cattle are described for comparison, and it is stated that it is not possible anatomically to distinguish the nodular form of skin TB. from the lesions described above. The latter are similar to the " skin lesions " described in various countries during recent years.—E. G. WHITE.

WEIKL. (1938). Zur Genese der Kälbertuberkulose. [**Genesis of Calf Tuberculosis**].—*Berl. Münch. tierärztl. Wschr.* Sept. 23rd. 577–578.

This is a comment on an article by RAUTMANN [*V. B.* **9.** 65.] in which it was stated that proof was wanting of intra-uterine infection by aspiration of amniotic fluid containing tubercle bacilli. W. records the finding of tubercle bacilli on three occasions in the stomach contents of aborted bovine foetuses. In the first case described, stomach content was inoculated into a g. pig in testing for *Brucella abortus*; the animal showed generalized TB. when killed. The other foetuses showed large numbers of tubercle bacilli in smears of the rumen contents, and the organisms were isolated by g. pig inoculation and in culture. Tuberculous lesions in the foetuses were situated in the liver, lungs and related lymph nodes and in several peripheral lymph nodes.—E. G. WHITE.

PLATEN, J. (1939). Ein Fall von akuter Miliartuberkulose bei einem Reh. [**Acute Miliary Tuberculosis in a Roe Deer**].—*Berl. Münch. tierärztl. Wschr.* Aug. 25th. 536–537. [4 refs.]

A case of generalized TB. with secondary acute miliary lesions in the lungs is described in a roe deer. A g. pig injected with material from the lesions showed generalized TB. when killed 25 days later, and growth of the organism on Petragnani's medium showed it to be of the bovine type. The affected animal had been on pasture previously grazed by cattle.—E. G. WHITE.

THORBURN, J. A., & THOMAS, A. D. (1940). **Tuberculosis in the Cape Kudu.**—*J. S. Afr. vet. med. Ass.* **11.** 3–10. 4 figs. [1 ref.]

TB. in the kudu has existed in parts of the Grahamstown area of the Cape Province for at least 20 years. It shows peculiarities not seen in the bovine. A characteristic lesion is swelling of the subparotid lymph node on one or both sides. The swelling becomes longer and larger until it bursts and discharges a thick, creamy pus. The infection spreads to other lymph nodes and ultimately results in generalized TB. Some animals make a roaring noise due to pressure on the larynx. It is suggested that the peculiar position of the primary lesions is due to irritation of the skin of the ears by thorns, ticks or the horn fly [*Lyperosia* (*Haematobia*) *irritans*]; this causes the animals to scratch the ears with the hind feet which may be contaminated with tubercle bacilli from the mud of drinking pools. A subparotid lesion of the kudu TB. type could be produced in cattle by scarification of the ear and rubbing in of pus from cases of kudu TB. Small, actinophytic colonies

were found in the pus in kudu TB., the significance of which could not be explained. Acid-fast bacilli were easily demonstrated in the pus.—E. M. ROBINSON.

I. URBAIN, A. (1938). L'infection tuberculeuse spontanée chez les mammifères sauvages en captivité. [**Spontaneous Tuberculosis in Wild Mammals in Captivity**].—*Ann. Inst. Pasteur.* **61.** 705–730. 2 tables. [Numerous refs.]

II. URBAIN, A., DECHAMBRE, E., & NOUVEL, J. (1939). Nouveau cas de tuberculose spontanée observée sur des mammifères sauvages vivant en captivité. [**Further Cases of Spontaneous Tuberculosis in Captive Wild Mammals**].—*Bull. Acad. vét. Fr.* **12.** 347–354. [1 ref.]

I. In a review of the incidence of TB. amongst captive wild mammals in French zoological gardens, monkeys, ungulates and the great cats were found to be most frequently infected in the order mentioned. 60% of 262 tuberculous monkeys showed lesions of a generalized nature and, of 30 cases examined by cultural and animal inoculation tests, 25 were due to infection of the human type, four of the bovine type and one of the avian type. The bovine type of bacillus was more frequently isolated from the ungulates, except for the elephant where the human type was often the cause of infection. The frequency of the human and bovine types was practically the same in all other species of wild mammals in the zoo on which typing work was done. The tuberculin test proved a reliable means of diagnosis in all captive mammals, except in monkeys where reactions were irregular in degree and duration. The complement-fixation test by Besredka's technique with egg antigen failed to reveal infection in two only of 183 tuberculous monkeys and was negative in 129 of 132 healthy monkeys which showed no evidence of TB. at autopsy. The test proved completely reliable in all of 12 positive and 15 negative examinations of other wild mammals. Prophylaxis of TB. in zoo animals is briefly considered.

II. A detailed description is given of the clinical symptoms and lesions found P.M. in eight cases of TB. in captive wild animals—seven ungulates and one carnivore. Lesions of chronic TB. were more frequently found in the male, in contrast with the pregnant female which more often showed a mixture of old lesions and evidence of acute infection. The tuberculin test did not always give definite results in advanced cases. The authors conclude that the clinical picture of the disease in the captive wild carnivore is similar to that found in domestic carnivores and that in ungulates the insidious development of the lesions greatly favours contagion.—R. O. MUIR.

RUYS, A. Charlotte. (1939). **On Tuberculosis in Man Due to the Bovine Type of the Tubercle Bacillus in the Netherlands.**—*Tubercle, Lond.* **20.** 556–560. 3 tables. [15 refs.] [Author's summary copied *verbatim*].

In the Netherlands children under 15 years of age with pulmonary tuberculosis were found to be suffering from a bovine infection in about 9 per cent of the cases. The figure was the same in the large towns and in the country districts.

In the large towns the adults with pulmonary tuberculosis were infected with the bovine bacillus in only 1 per cent of the cases, whereas in the country 6 per cent suffered from a bovine infection.

Other forms of tuberculosis, in both the large towns and in the country, were caused in about 20 per cent of cases by the bovine type of bacillus.

It is probable that some of the adults with bovine phthisis have acquired their infection through inhalation when in contact with tuberculous cattle.

Raw milk and milk products are the principal sources of the infection in all forms of bovine tuberculosis in children and in the extrapulmonary form of the disease in adults.

These investigations confirm the theory that pulmonary tuberculosis of the adults is mainly the result of an exogenous air-borne superinfection.

WILCOCKS, C. (1939). **Tuberculosis in the Natives of Tropical and Subtropical Regions.** *Trans. R. Soc. trop. Med. Hyg.* **32.** 669–696. 3 figs., 1 table, 3 graphs. [Numerous refs.]

In the section on bovine TB., W. quotes CORNETT (1934) and CARMICHAEL (1938) to the effect that TB. in cattle is rare in East Africa. He himself failed to find tubercle bacilli in the milk of 130 cows in Tanganyika.

In the discussion on the paper SCOTT remarked somewhat misleadingly that cattle are not infectable by the human type bacillus. GILMOUR gave the following figures for tuberculous cattle and pigs observed: 11 cases among 672 cattle at Singapore and none among 13,000 cattle from Bali; 757 among 151,000 pigs at Singapore and 61 among 11,000 pigs from Bali.—J. E.

THOMSEN, K. G. (1940). Nogle Desinfektionsforsog med Fenylmerkuriacetat mod Tuberkelbakterier. [**Phenyl Mercuric Acetate as a Disinfectant against Tubercle Bacilli**]. *Beretn. 5. nord. Vet. mode, Kbh., 1939.* pp. 1101–1103. Discussion pp. 1103–1104.

Phenyl mercuric acetate (2% and 4%) issued under the name "merfen" killed tubercle bacilli in sputum in 5 min. when mixed with the sputum, and in 30 min. when the sputum was merely placed in the solution. Tubercle bacilli in material smeared on a slide which was placed in merfen solution were dead after 30, 10 and 5 min. respectively in separate tests. Merfen allowed to soak into contaminated whitewashed wood could not be relied upon to kill tubercle bacilli in 30 minutes. All results were determined by g. pig inoculation or culture.

BENDIXEN, in discussion on the paper, described the routine use of 2% phenyl mercuric acetate for the disinfection of the hands after P.M. examinations.—J. E.

STAMATIN, N., & STAMATIN, L. (1939). Virulence des trois types de bacilles tuberculeux pour la souris blanche. [**Virulence for White Mice of the Three Types of Tubercle Bacilli**]. *Ann. Inst. Pasteur.* **63.** 269–292. 3 figs. 3 tables. [Numerous refs.] [Shorter version appeared in *C. R. Soc. Biol. Paris.* 131. 511–514 (1939)].

The authors attempted to ascertain whether white mice are suitable experimental animals for testing the virulence of various strains of *Mycobacterium tuberculosis* and for distinguishing between the human, bovine and avian types.

Mice were inoculated, intravenously and occasionally intraperitoneally, with decreasing amounts (0·1–0·00001 mg.) of numerous strains of human, bovine and avian types of *M.tuberculosis*. The virulence of all strains used was first tested: bovine strains in rabbits, human strains in g. pigs and sometimes in rabbits, and avian strains in fowls and rabbits.

It was found that avian bacilli, inoculated intravenously, were much less virulent for mice than mammalian bacilli, and this method allowed avian bacilli to be distinguished from human and bovine types. The duration of the disease with all types was similar when intraperitoneal inoculation was used; the development of infection by human and bovine type bacilli was much slower and the bacilli much less virulent after intraperitoneal than after intravenous inoculation. Doses of 0·00001 mg. failed to multiply or cause death. Doses of 0·1–0·01 mg. (avian) caused death in more than 80 days, whereas similar virulent mammalian strains proved fatal within 30–50 days. Gross infections of the spleen and liver were generally caused by avian strains, while human strains produced more massive lesions in the lungs.

Intravenous inoculation of human strains in doses of 0·001–0·00001 mg. caused slight lesions and rarely proved fatal (5 out of 24). Bovine strains of similar virulence caused gross lesions and usually death (15 out of 18).

It is concluded that white mice are suitable animals for these tests.—C. V. W.

HARPØTH, H. (1938). Ueber die serologischen Verhältnisse des aviären Tuberkelbazillus. [**Serology of Avian Tubercle Bacilli**].—*Z. Tuberk.* **79.** 140–153. 20 tables. [Numerous refs.]

H. examined strains of bovine, avian and human type tubercle bacilli by ordinary agglutination and by absorption tests. He found that the avian strains did not absorb antibodies prepared with bovine or human bacilli.

In further research with 21 avian type strains he found that 18 absorbed the antibodies of an anti-avian serum, whilst three did not. Two of these three strains were active with their specific antisera directly and reciprocally, but the third and last strain was active only against its specific antiserum. Thus three serologically specific groups of avian type tubercle bacilli were identified.—J. E.

CABASSO, V., SCHAEFER, W., & HARPOTH, H. (1939). Sur la classification sérologique des bacilles tuberculeux aviaires et des bacilles analogues. [**Serological Classification of Avian Tubercle Bacilli and Analogous Bacilli**].—*C. R. Soc. Biol. Paris.* **131.** 969–971. [4 refs.]

The serological types of avian tubercle bacilli described by various authors are compared in order to establish the number of distinct types at present recognized. Complement-fixation tests with the two main serological types encountered by HARPØTH [see preceding abstract] in Denmark and by SCHAEFER [*V. B.* **8.** 266.] in France, using the corresponding antisera from which the group antibodies had been removed, showed that the serological type, isolated by Harpøth from 18 out of 21 cases, belonged to Schaefer's serological type II. Harpøth's other serological type did not react with Schaefer's type antisera. A serological study of 16 recently isolated avian strains and six strains used for the preparation of avian tuberculin showed that ten belonged to Schaefer's type I and 12 to type II. An old strain of acid-fast bacillus, isolated from a horse and possessing the cultural characters of the smooth avian type of tubercle bacillus, was found to resemble two serological types of avirulent avian tubercle bacilli isolated by Schaefer from g. pigs and from man, in that it did not belong to a known serological type of virulent avian tubercle bacilli.—R. O. MUIR.

STRENG, K. O. (1940). Étude des caractères d'atténuation du bacille BCG suivant le nombre de passages de ce germe sur pomme de terre à la bile de boeuf. [**Characters of Attenuation of BCG According to the Number of Passages on Ox Bile Potato Medium**].—*Ann. Inst. Pasteur.* **64.** 196–202. 3 tables. [5 refs.]

A comparison was made of the biological characters, pathogenic power for g. pigs, and the immunizing properties of two BCG strains of the tubercle bacillus which had been preserved for 5½ years on a glycerinated water-potato medium, one after 419 successive subcultures on ox-bile potato medium, and the other after its 554th culture on the bile medium. The only difference was that the strain which had been subcultured more times seemed to be slightly less pathogenic for the g. pig by the intraperitoneal route, and was less numerous microscopically in the epiploic lesions and culturally in the inguinal and subhepatic lymph nodes of injected g. pigs.—R. O. MUIR.

CLAYSON, C. (1939). **The Effects of Varying Degrees of Allergy in Experimental Tuberculosis.**—*Tubercle, Lond.* **20.** 533–542. 8 tables. [7 refs.]

A series of tuberculin-tested g. pigs was inoculated with living human tubercle bacilli. The animals were retested three times and superinfections carried out at intervals during the development of the allergic state. Difficulty in differentiating the effects of the initial reaction from those of superinfections was experienced. It was found that a very marked degree of allergy was dangerous in the event of a massive superinfection. The formation of pus in glandular lesions appeared to be a consequence of allergy, but the extent of visceral disease did not bear any relationship to the degree of allergy at superinfection.—J. R. LAWSON.

BONÉT-MAURY, P., & OLIVIER, H. R. (1939). **Effect of Irradiating the Tubercle Bacillus with Radon. [Correspondence].**—*Nature, Lond.* **144.** 833–834.

In inhibiting proliferation of the tubercle bacillus and avoiding, as far as possible, modifications of the other cellular functions, the authors claim to have produced a vaccine which is completely harmless and still has definite antigenic properties. The vaccine is produced by irradiating aqueous suspensions of human tubercle bacilli with the radioactive element, radon. Details of the immunity produced are not given, but it is stated that an improvement in the lesions of certain types of TB. was observed following treatment in 60 cases [presumably human], and that the vaccine never caused recrudescence of the disease. G. pigs vaccinated with the irradiated bacteria and afterwards tested with virulent cultures showed a survival time double that of the controls.—J. R. LAWSON.

RIST, N., BLOCH, F., & HAMON, V. (1940). Action inhibitrice du sulfamide et d'une sulfone sur la multiplication *in vitro* et *in vivo* du bacille tuberculeux aviaire. **[Inhibitory Action of Sulphamide and of a Sulphone on Growth of Avian Tubercle Bacilli *in vitro* and *in vivo*].**—*Ann. Inst. Pasteur.* **64.** 203–237. 7 figs., 7 tables. [Numerous refs.]

After a review of the literature on the efficacy of sulphamide in the treatment of experimental TB. of g. pigs, an experiment is described, illustrated by two tables, which demonstrates the inhibitory action of sulphamide on growth of an avian strain of the tubercle bacillus in Sauton's medium. An investigation of the therapeutic action of sulphamide administered orally to 32 g. pigs, affected with acute TB. of the avian type, proved inconclusive, owing to the slow and irregular multiplication of the bacilli in the spleen. Study of the action of sulphamide and of a sulphone on acute TB. of the Yersin type, produced in 18 rabbits by intravenous injection of a large dose of avian tubercle bacilli, demonstrated that both drugs retarded multiplication in the spleen and liver so that the number of bacilli remained stationary.—R. O. MUIR.

URBAIN, A., & NOUVEL, J. (1939). Un nouveau cas de rouget du sanglier (*Sus cristatus* Wagner). **[Swine Erysipelas of a (Captive) Wild Boar].**—*C. R. Soc. Biol. Paris.* **131.** 1090–1092. [1 ref.]

A young wild boar in captivity died from the septicaemic form of *Erysipelothrix rhusiopathiae* infection, and the culture obtained was typed for pathogenicity in mice, g. pigs and rabbits. Another wild boar of the same group died several days later and had several rather characteristic plaques on the ventral surface of the body. In addition to the usual signs of septicaemia, there was acute enteritis, gross enlargement of the spleen and endocarditis.

Doses of 10 c.c. of anti-erysipelas serum were given to all the remaining animals in the group and to nearby animals of the pig family and no more cases occurred.

[U. has previously reported the isolation of *E. rhusiopathiae* from a kangaroo. (1936). *C. R. Soc. Biol. Paris.* **123.** 352].—C. V. WATKINS.

MAGNUSSON, H. (1938). Om pyemi hos föl orsakad av Corynebacterium equi. [**Pyaemia in Foals Caused by** *Corynebact. equi*].—*Skand. VetTidskr.* **28.** 424–445. 7 figs. [19 refs.] [English summary]. [Abst. from translation in *Vet. Rec.* **50.** 1459–1468 (1938)].

Since M. first recorded (1923) *C. equi* infection in the horse, many misquotations have appeared in veterinary literature, especially through confusion between *C. equi* and *C. pyogenes*. Differential characteristics of the two organisms are as follows :–

CHARACTERISTICS	*Corynebacterium pyogenes*	*Corynebacterium equi*
Staining.	Feebly Gram-positive.	Gram-positive.
Morphology.	Thin rods.	Large bacteria, coccus-like or ovoid. Like streptococci in surface colonies. In deep colonies or broth, irregular rods, "V" formations, sometimes like *Streptothrix.*
Optimum Temperature	37°–38°C.	18°–37°C.
Cultural Requirements.	Serum.	Ordinary media.
Growth on Potato.	Nil.	Good, turning pink and then yellow.
Milk.	Good growth, coagulation and peptonization.	Poor growth, no coagulation.
Coagulated Serum	Small colonies. Proteolysis in 2 or 3 days	Moist growth in 1 day, turning pink. No proteolysis.
Biochemical Properties.	Ferments glycerin, glucose, galactose, fructose, mannose, saccharose, maltose, lactose, dextrin. Proteolytic. Haemolytic.	No fermentation. Non-proteolytic. Non-haemolytic.
Biological Properties.	Suppurative processes in cattle, pigs, sheep, goats, and rabbits. Lymph nodes not affected. Dies quickly in culture.	Most common in lung abscesses of horses. Affects also pigs, goats and g. pigs. Lymph node abscesses. Remains viable in liquid media for years. Subculturing does not lessen virulence.
Antibody Production.	Positive.	Negative in natural cases.

C. equi belongs to the group of pseudodiphtheria bacteria. It differs from Hoffmann's bacillus in being chromogenic, and pathogenic for g. pigs.

Out of 744 foals examined by M., 88 were pneumonia cases of which 23 were caused by *C. equi*. Only one case of *C. equi* infection without pneumonia was

found. Seventeen case reports are detailed. Suppurative broncho-pneumonia with greyish-red pus in the bronchi and purulent mediastinal lymph nodes usually occurred. Purulent mesenteric lymph nodes with ulceration of the adjoining intestinal mucous membrane were found. The typical form of pneumonia is described. Pleurisy and eye lesions were rare. The spleen, kidneys and head and neck lymph nodes were never involved. The disease appears to be localized to large breeding studs and to certain areas in various countries, but is not common.

Pathogenicity and agglutination experiments are described. Vaccination and serum treatment proved unsuccessful. The disease was controlled by advancing foaling times and by removing the in-foal mares to outlying farms as soon as possible. The infection probably resides in the soil and multiplication may occur therein.—C. V. Watkins.

Olafson, P. (1940). **Listerella Encephalitis (Circling Disease) of Sheep, Cattle, and Goats.**—*Cornell Vet.* **30.** 141–150. 6 figs. [2 refs.]

This disease was first diagnosed in New York State in 1931 in a flock of sheep. It had occurred in the same flock the previous year, but attempts to isolate a causal organism had failed. It was found that, unless heavy inocula of brain from affected animals were sown, cultures did not grow. The disease has since been diagnosed in cattle and goats. There appears to be a definite seasonal incidence between December and June. Intracerebral inoculation with affected brain tissue of sheep and rabbits produced an acute encephalitis and meningitis unlike the natural disease as regards symptoms and duration. Intravenous inoculation and intranasal instillation with trauma failed to infect sheep.

A general catarrhal rhinitis had been seen in some flocks before the encephalitis appeared, although not all of the sheep developed the encephalitis.

The affected animal is depressed, and indifferent to its surroundings. It may lean against a post for hours. On the second or third day the tendency to circle commences; circling is in one direction only. There may be some degree of unilateral facial paralysis. The head is turned towards the flank and when straightened flies back to its original position. The duration of illness is 3–7 days. There are no gross lesions. There is perivascular cuffing, and the most characteristic lesion is the presence of microscopic cellular foci in the parenchyma of the brain in which the organisms can be demonstrated. Lesions have not been found in the spinal cord or spinal meninges.—D. L. Hughes.

Piening, C. (1939). Weitere Beobachtungen bei der Enteritisbekämpfung. **[Further Observations on the Control of Enteritis in Cattle].** *Berl. Münch. tierärztl. Wschr.* Dec. 1st. 703–705. 2 tables. [4 refs.]

In routine diagnostic work on *Salmonella enteritidis* infection in cattle, P. has found that there is no parallel between the blood agglutinin titre and the excretion of the organism. As the important task is to detect continuous excretors, a direct bacteriological examination of faeces is necessary. Blood serological tests should be omitted. Faecal samples for test should not be kept in cold storage, as the organism dies out quickly in material so preserved.—J. E.

Beckett, F. (1939). **Notes on Paratyphoid in Swine.**—*Vet. J.* **95.** 436–439.

B. emphasizes his opinion that paratyphoid of pigs (*Salmonella cholerae-suis* infection) "and its associated conditions" cause the greatest loss to pig breeders in this country and that the disease is contagious. He mentions several attempts to achieve control, without giving any exact details or bacteriological confirmation of

the outbreaks. He disagrees with the WALDMANN method of a semipermanent hut and run for sows and their litters. He claims that good results may be obtained by means of dietetic adjustments, good housing [temperature and atmospheric conditions are not mentioned], feeding of minerals including iron, and maintaining pigs in the open.

B. claims to be able to make a differential diagnosis between swine fever and paratyphoid by attention to the following points: the length of time the disease has been in the herd, the age and number of animals affected, whether S.F. has previously occurred, the history of recent additions to the herd, the season of the year, and P.M. findings (absence in paratyphoid of the true concentric "button" ulcer commonly found in cases of true swine fever). — C. V. WATKINS.

LIECHTENSTEIN, G. P. (1938). Das Verhalten des Erregers des seuchenhaften Verwerfen (Bac. Abortus Bang) in der Milch und einigen Milcherzeugnissen. [**Behaviour of *Brucella abortus* in Milk and Some Milk Products**]. *Milchw. Forsch.* **19.** 241–259. 7 tables. [Numerous refs.]

The work is divided into the following sections: (1) Introduction. (2) Review of literature on the finding of brucella organisms in milk and dairy products and their viability therein. (3) Culture technique methods. (4) Action of lactic acid on the viability of *Br. abortus* in milk. L. found that it remains alive for many days (over a week) if the lactic acid does not exceed 22 S.H.°, but dies in two days at 34 S.H.° or over. In practice this means that the brucella organisms remain alive in various forms of milk for longer than such milk remains drinkable. (5) A small experiment showed that the whipping of cream had no adverse effect on the brucella organisms therein. (6) In a few tests in which *Br. abortus* was inoculated into skim milk incubated at 37°C., it was found that the organisms multiplied considerably during the first two days and thereafter their number diminished rapidly. In skim milk containing specific agglutinins the increase in the first day was only half that in milk without agglutinins. The reduction in bacterial numbers was associated with increasing acidity. (7) Victoria blue (1 : 20,000) and gentian violet (1 : 250,000) + malachite green (1 : 500,000) were found to be equally useful in obtaining pure brucella cultures in broth cultures inoculated with infected milk. This method is said to be superior to the agar plate method, as more voluminous growth is obtained [S.H.° = degrees of acidity]. —J. E.

COTTON, W. E., BUCK, J. M., & SMITH, H. E. (1938). **Communicability of Infectious Abortion between Swine and Cattle.** *Tech. Bull. U.S. Dep. Agric.* No. 629. pp. 8. 1 table. [5 refs.]

Investigations were conducted along two different lines to obtain more definite information on the susceptibility of cattle to *Brucella abortus* of the porcine type. Attempts were made first to infect eight pregnant cows and heifers by subjecting them to severe artificial exposure through the conjunctiva, conjunctiva and digestive tract, and the skin. In the second experiment groups of pregnant cattle were confined for several months in enclosures with swine artificially and naturally infected.

Three of the eight cattle subjected to the more severe exposure under the conditions of the first experiment contracted the infection; two of these animals aborted, and the third produced a vigorous calf, but the results of uterine and colostrum examination for *Br. abortus* were positive. The cattle in the second experiment reacted at times to the agglutination test in a titre as high as 1 : 200,

but in none of the cattle was the infection proved and all produced vigorous calves.

It is concluded that cattle have considerable resistance to infection with the porcine type of *Br. abortus* and seldom contract the disease from swine as a result of natural contact with them.—R. ALLCROFT.

HARDENBERGH, J. G., & MILLS, A. M. (1939). **Some Results of Calfhood Vaccination Against Bang's Disease.** *Ass. Bull., internat. Ass. Milk Dlrs.* **31.** 139–143. 8 tables. [8 refs.]

The authors give data of field experiments in which they inoculated groups of heifer calves (588 animals altogether) between four and eight months old with strain 19 vaccine (live vaccine—attenuated strain). No noticeable systemic effects were observed; the local swelling and elevation of temperature that occurred after inoculation were transient. Pronounced agglutinin formation followed, the peak being reached in about ten days. The majority of the animals ceased to react to the agglutination test within 4-6 months, but a few low titres persisted for varying lengths of time. Only one animal remained definitely positive. The animals were bred, very few abortions taking place in both the vaccinated and control groups, and although the incidence was certainly less in the former the difference between the two groups was not striking; it was nevertheless considered satisfactory in view of the lack of exposure to virulent infection.

All the data presented deal with first gestations but further large scale experiments are being carried out to determine the protection afforded in the second and subsequent pregnancies. [It is presumed that the calves were in naturally infected herds and, therefore, exposed to the common risks of infection in such herds.]
—J. R. LAWSON.

MCEWEN, A. D. (1940). **Experiments in Contagious Abortion: Field Immunisation Experiments with a Vaccine Prepared from Strain 45.** *Vet. Rec.* **52.** 19–23. 2 tables, 1 appendix. [5 refs.] [See also *V. B.* **8.** 416, and **10.** 565].

This is a report of further results in a series of field immunization trials with a living avirulent strain of *Brucella abortus* (strain 45). Six of the eight original herds were observed further, while six new herds were included. The disease was active in all these herds, and conditions favoured spread of infection. Combining the present with the previous results the author found that in the first year 7·3% of 519 vaccinated animals became infected with *Br. abortus*, while only 1·1% of 390 became infected in the second year. Of 143 animals observed during the third year none became infected. A reasonable proportion of control animals observed over the same period showed an infection rate of 6%, 16%, and 20·6% in the same years. Results are encouraging, and indicate that the majority of animals vaccinated were resistant under natural conditions of exposure to infection. With a less attenuated vaccine a better protection may possibly be obtained and "it is possible that such a vaccine might be used with safety and without causing any vaccination infection were animals to receive preliminary inoculations with a culture from strain 45".

It is pointed out that the vaccination of non-reactors is unavoidably attended by the risk of vaccinating infected cattle which show no serum agglutinins. A number of abortions may therefore occur, especially in the first year.—H. E. H.

ZELLER, H., & HENNINGER, R. (1939). Untersuchungen über die Beeinflussung der Abortus Bang-Infektion (Bruzellose) des Rindes durch das Serobortan-Vakzine-Verfahren nach Oppermann-Curtius und das AO_3-Verfahren nach

Dr. Bertram-Soest. **[The Value of the " Serobortan-Vaccine " Method of Oppermann-Curtius, and the AO_3 Method of Bertram on Brucella Infection in Cattle].**—*Z. InfektKr. Haustiere.* **54.** 265–280.

The authors have been quite unable to confirm the claims of CURTIUS and of OPPERMANN, *viz*, that if infected cattle are injected with " serobortan " (a product of horse serum together with certain mineral additions) and at the same time are given a specific *abortus* vaccine, their positive blood and serum titres soon disappear, and that, in a considerable percentage of cows which shed the organism in the milk, excretion ceases. [" Serobortan " was issued in 1934 and has been mentioned in sundry articles by OPPERMANN since that date. No satisfactory demonstration of its value has been made.—Ed.] Sixteen cows in all were treated : each received 3-6 doses of serobortan subcutaneously or intravenously, and eight of these were also given Yatren vaccine (*abortus*) and eight " D- vaccine *abortus*." In no case was a cure effected ; nor were the blood or milk titres significantly influenced.

They were also unable to confirm the claims of BERTRAM (Soest) that his preparation, " AO_3 ", which contains camphor and the sodium salt of *o*- iodophenol, would cure brucella infection of cattle. Five cows were treated according to Bertram's instructions, but in no case was a cure obtained.—A. W. STABLEFORTH.

JULLIEN, J. (1936). Prophylaxie de la fièvre ondulante. **[Prophylaxis of Undulant Fever].**—*Progr. méd., Paris.* **63.** 1898–1904.

A general note on the question.

LISBONNE, M. (1936). Le diagnostic de la mélitococcie par les méthodes de laboratoire. **[Diagnosis of *Brucella melitensis* Infection by Laboratory Methods].**—*Progr. méd., Paris.* **63.** 1889–1894. [2 refs.]

A general note on the question.

STEWART, Sarah E. (1940). **Studies on the Toxins and Antitoxins of *Clostridium perfringens* [*welchii*].**—*Publ. Hlth Rep., Wash.* **55.** 753–775. 1 fig., 9 tables. [Numerous refs.] [Author's summary copied *verbatim*].

Cl. perfringens [*welchii*] type A has been shown to produce at least three different toxin components which are dependent on the type of medium used for culturing the organism. Two of the components are hemotoxins which can be separated by absorption on dried red blood cell stroma and by filtration. One is lytic for sheep red blood cells while the other has little action on them after 1 hour's incubation at 37°C. These two hemotoxins were shown to be antigenically different. Lipoids were found to inhibit the formation of the hemotoxin which is lytic for sheep red blood cells.

The hemotoxins may be reversibly inactivated by separating them from the broth in which they are suspended or by bubbling oxygen through the active hemolysins. The hemotoxins may be separated from the broth by filtering through collodion membranes. Activation of the hemolysins can be brought about by introducing substances containing SH groups.

A nonhemolytic toxin component was found in some of the type A filtrates. It was possible to separate this toxin from the hemolysins by filtering through graded membranes.

The " nonspecific toxin " resulting from the cultivation of *Cl. perfringens* type A in media containing from 1 to 2·25 percent glucose was found to be neutralized by antitoxins having high antihemolytic titers for the two types of hemolysins.

DISEASES CAUSED BY PROTOZOAN PARASITES

MALBRANT, R., BAYROU, M., & RAPIN, P. (1939). Protozooses sanguines des animaux domestiques en Afrique équatoriale française. [**Protozoan Blood Parasites of Domestic Animals in French Equatorial Africa**].—*Bull. Soc. Path. exot.* **32.** 953–960. [8 refs.]

In French Equatorial Africa infections with *Trypanosoma theileri*, *T. vivax*, *T. brucei* and *T. evansi* have been recognized. One case of *T. evansi* infection has been encountered in the French Congo, but it was thought that infection had been acquired in the Chad area where this trypanosome may be relatively common.

Haemosporidia encountered consist of *Babesia bigemina*, *B. equi*, *B. canis*, *Babesiella berbera* [*B. argentina*], *Theileria parva*, *T. mutans*, *Anaplasma marginale* and *A. ovis*.

East Coast fever has only occurred on one farm in the French Congo, the outbreak occurring in cattle imported from South Africa. The outbreak was dealt with by dipping.

Rickettsia canis, *R. bovis*, *R. conjunctivae* and *R. ruminantium* occur in the area, heartwater being particularly important in the Chad territory where it is responsible for severe mortality in imported sheep.

Eperythrozoon wenyoni has been encountered in blood smears from an ox at Fort Lamy, and *Hepatozoon canis* has been recorded from dogs in Brazzaville and at Fort Lamy.—U. F. RICHARDSON.

I. MELENEY, H. E., FRYE, W. W., & LEATHERS, W. S. (1939). **The Effect of Prolonged Cultivation on the Pathogenicity of Various Strains of *Endamoeba histolytica* for Kittens.**—*Amer. J. Hyg.* Sect. C. **29.** 61–71. 1 fig., 1 table. [17 refs.]

II. SWARTZWELDER, J. C. (1939). **Experimental Studies on *Endamoeba histolytica* in the Dog.**—*Ibid.* 89–109. [Numerous refs.]

I. Fourteen strains of *E. histolytica* which had been maintained by cultivation in egg : Ringer's : horse-serum : rice medium were tested as to their pathogenicity for kittens at intervals over a period of four years. No complete loss of pathogenicity occurred, and a marked decrease was detected in only one strain. The strains varied in their pathogenicity at the time of the initial test, these variations being maintained throughout the course of the experiments.

The pathogenic index of a strain was calculated on the basis of the extent and severity of the colon lesions of infected kittens. Nine classes of colons were recognized, and the " pathology produced per day " was calculated by dividing the class number of the colon by the number of days the kitten survived. The average of the " pathology produced per day " for the kittens in a given experiment is designated the pathogenic index for the strain for that experiment.

The possible influence on pathogenicity of bacterial contamination occurring during maintenance is discussed, and it is recorded that cultures of most of the strains contained anaerobes even after a number of years.

II. S. records attempts to ascertain whether excystment of *E. histolytica* may occur without the cysts passing through the stomach and small intestine, and whether auto-infestation may occur as a result of such excystment in the large intestine of the infected animal. The material for inoculation, which contained mature and immature cysts from seven human strains known to be infective to dogs, was freed from trophozoites by exposure to a temperature of 5°C. for several days. Dogs were inoculated by injection into the ileum, caecum or rectum, and after 2–8 hours were killed and examined. No evidence could be detected that

excystment had occurred. When, however, stasis was induced, and the dogs were not killed for several days, excystment did occur in one animal out of ten under experiment. It is suggested that in this case the operative technique used to induce stasis may have led to an overflow of gastric juice into the large intestine.

In order to follow the process of excystment, dogs were fed material containing cysts freed from trophozoites, and examined at various intervals after the feed. Excystment is described as being preceded by development of pseudopodia, and motility within the cyst, followed by the emergence of trophozoites which never contain more than four nuclei. After 13–16 hours uninucleate forms predominate, and forms with more than four nuclei are not encountered.

To test the possibility of infection by the ingestion of trophozoites, blood and mucus were collected from the large intestine of infected dogs. (Encystment does not occur in dogs unless they are fed on a liver diet: the donor animals were fed on salmon to exacerbate the infection, and a dysenteric condition occurred, leading to death in one case.) Five of 13 dogs fed with material containing trophozoites, but free from cysts, developed infection. It thus appears that amoebic infection may spread in canines by direct anus-to-mouth passage in the absence of cyst production.—U. F. Richardson.

Bardelli, F., & Menzani, C. (1938). L'entero-epatite infettiva [Blackhead]. [**Infectious Enterohepatitis (Blackhead)**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 848–855. [In Italian: English, French and German summaries].

Blackhead is recognized principally as a disease of young turkeys, but it may also affect fowls and guinea fowl, and in the latter species it is as severe as in turkeys, causing a mortality of 80–100%. The disease is favoured by conditions causing debility, one of the most common of which is a heavy infection with *Heterakis*, and according to Tyzzer this nematode acts as a carrier of the pathogenic agent.

The clinical symptoms of the disease are not considered to be characteristic, as the black discoloration of the head is often absent, but diarrhoea usually occurs, the faeces being greenish and frothy. Diagnosis may be confirmed by the detection of the causal organism in the faeces. This is considered to be a *Blastocystis*, and *Histomonas* is regarded as a secondary invader. A recent observation, however, has suggested that the *Blastocystis* may be a stage in the developmental cycle of *Histomonas*. A further publication on this observation is promised.

The condition is essentially a typhlohepatitis, but in acute cases lesions may be confined to the caeca. Histologically, the liver lesions commence as an infiltration of reticulo-endothelial elements, with atrophy of the liver cells. In the later stages coagulative necrosis occurs.

In the caecal mucous membrane there is an infiltration of epithelioid and lymphocytic elements, which may fuse to form numerous giant cells, the inflammation being essentially granulomatous.—U. F. Richardson.

Pires, F. A. (1938). Um foco de tripanosomíases na Reinguira. (Pôsto administrativo da Botera). [**Bovine Trypanosomiasis at Reinguira, Angola**].—*An. Serv. Vet. Pec. Angola, 1937.* pp. 67–68.

P. reports an outbreak of trypanosomiasis in a herd of native cattle. Affected animals were very thin, had high temperatures, and many had enlarged inguinal lymph nodes. P.M. examination showed no specific lesions, the animals being anaemic and having generalized oedema of a mild character.

Blood films demonstrated large numbers of trypanosomes which P. describes. He explains that he was handicapped by an insufficiency of staining materials and apparatus, but concludes that the parasites were *T. congolense*.

In the immediate neighbourhood of the farm, *Stomoxys* and *Tabanus* were common, and 5 km. away, near the rivers Cubal, Cunenga and Luenga, *Glossina* exists in great numbers. There is a great number of big game animals near these rivers and these animals probably harbour the trypanosome.

Practically the whole herd of 57 animals died of the disease.—MILLER WATSON.

LAGODSKY, H. (1939). Atténuation de la virulence et du pouvoir pathogène d'un trypanosome (*T. annamense*, chimio-résistant), après passage dans un organisme animal, traité par Sb. [**Attenuation of the Pathogenicity of Drug-Fast *Tryp. annamense* after Passage through an Animal Treated with Antimony**].—*Bull. Soc. Path. exot.* **32.** 35–38.

Virulent, arsenic-resistant *Tryp. annamense* was injected into rabbit I which had been treated six hours previously with methylglucamine *p*-aminophenylstibonate which is ineffective against *Tryp. annamense*. Nine days later, a series of passages was started. At the first passage two g. pigs, a mouse and a rabbit (rabbit II) were used and all became infected. Rabbit II was then treated with tryparsamide, but it was not cured, thus demonstrating that the trypanosomes were tryparsamide-fast. Before this treatment, blood was taken from rabbit II for a second passage and inoculated into two rabbits and four g. pigs. The rabbits became infected subclinically and the parasites disappeared spontaneously from one (rabbit III), and from the other after treatment with methylglucamine *p*-aminophenylstibonate. Of the g. pigs, three were not infected, but the fourth showed parasites in the blood which disappeared spontaneously ; this g. pig later succumbed to reinfection with a drug-fast strain of *Tryp. annamense*, thus showing that no immunity had been produced. The third passage was effected from rabbit III into a rabbit, two mice, two cats and a g. pig, of which only the rabbit became infected, subclinically, and the parasites later disappeared spontaneously.—M. L. B.

GUSEV, V. F., BALYKIN, M. T., MEL'NIKOV, D. D., & TERENT'EV, P. S. (1940). K voprosu o spetsifichnosti formol-reaktsii pri su-auru verblyudov. [**Specificity of the Formol Reaction in the Diagnosis of Trypanosomiasis in Camels**].—*Rev. Microbiol., Saratov.* **17.** 313–321. 3 tables. [18 refs.] [French summary].

In the course of an investigation into the incidence of surra among camels in the Kara-Kalpak Republic, the authors subjected the blood of 1,311 camels to a microscopic examination and also to a formol test. Only in four cases did positive results of the two examinations coincide, although the microscopic examination revealed the presence of trypanosomes in 26 cases and the formol test results were positive or doubtful in 97 cases.

On these grounds the authors deny that the formol test can be regarded as specific.—E. MARTIN.

ADLER, S., THEODOR, O., & WITENBERG, G. (1938). **Investigations of Mediterranean Kala Azar. XI. A Study of Leishmaniasis in Canea (Crete).**—*Proc. roy. Soc.* Ser. B. **125.** 491–516. 3 figs. [15 refs.] [For previous parts, see *V. B.* **5.** 703].

In Canea, human and canine visceral leishmaniasis are practically confined to a new part of the town in which the houses have gardens and where *Phlebotomus major* is the most common sandfly species. Cutaneous leishmaniasis, on the other hand, occurs in the old Turkish part of the town, *P. sergenti* being apparently the main vector.

Nine cases of canine visceral leishmaniasis came under observation, and it

was noted that three of the animals experienced difficulty in barking, a condition found to be due to infiltration of the larynx and vocal cords with macrophages, lymphocytes and plasma cells.

A study of the skin lesions showed that areas around ulcers contained fewer *Leishmania* than intact skin. In visceral leishmaniasis, skin ulceration follows degenerative changes, atrophy and necrosis of the dermis, whilst in the cutaneous form ulceration follows infiltration of the dermis with macrophages, of such an intensity that it interferes with the local blood supply.

It was noted that in canine visceral leishmaniasis a diet of fresh meat led to an improvement in condition, and a reduction in the number of *Leishmania* in the skin. It was thought that the meat diet favoured the ingestion of parasites by the macrophages, and it is suggested that the improvement in condition was due to a reduction in the cellular infiltration of the alimentary mucosa, allowing an improvement in food absorption.

This article also gives interesting notes on the breeding and handling of sandflies, and summarizes information on the distribution of human visceral leishmaniasis, and on the species of *Phlebotomus* which act as vectors in the various areas.—U. F. RICHARDSON.

YAKIMOV, V. L., SENYUSHKINA, V. P., & MACHUL'SKIĬ, S. N. (1940). O koktsidioze morskikh svinok v SSSR. [**Coccidiosis of G. Pigs in the U.S.S.R.**].—*Rev. Microbiol., Saratov.* **17.** 391–401. 1 fig., 3 tables. [9 refs.] [French summary].

Investigating an outbreak of disease among laboratory g. pigs at a biological products factory, the authors found *Eimeria caviae* oocysts in 74 of 165 animals examined. Sixty-nine of the g. pigs died (41·8%).

There is a detailed description of clinical observations and pathological findings, and recommendations are made for the control of the disease by sanitary measures.—E. MARTIN.

BECKER, E. R., & WATERS, P. C. (1938). **The Influence of the Ration on Mortality from Caecal Coccidiosis in Chicks.**—*Iowa St. Coll. J. Sci.* **12.** 405–414. 3 tables. [6 refs.]

A commercial control ration which gave no protection against coccidiosis was fed to White Leghorn day-old chicks for the first 14 days of life; the chicks were then divided up into groups, including controls, and given test diets for the desired lengths of time after which they were inoculated directly into the crop with numbers of oocysts of *Eimeria tenella* ranging from 50,000–130,000. In each experiment the control and experimental series received the same calculated number of oocysts per bird. If the chicks were going to succumb to the disease, deaths occurred on the fifth, sixth, seventh and eighth days; dead birds were autopsied, and haemorrhagic caeca and merozoites in the caecal contents were considered evidence of the lethal effects of the parasite.

The results of a series of six experiments showed that a combination of dried skim milk or dried buttermilk at a 5–10% level, and wheat middlings at a 30% level in the diet caused a high death rate in chicks experimentally infected with caecal coccidiosis. Apparently the combination of the dried milks and middlings at the higher levels in the ordinary types of poultry rations, permits a condition to develop in the bird that is highly unfavourable for its recovery, but the nature of this condition is not yet known. Other rations, containing no dried milks or middlings or very low levels of these constituents, did give some degree of protection against coccidiosis infection. None of the rations described in this paper are

recommended to the poultryman for the purpose of reducing losses for caecal coccidiosis, as the diets are not well balanced and paralysis and other dietary disorders might result.—R. ALLCROFT.

HEGNER, R. (1937). **Periodicity in the Asexual and Sexual Cycles of Avian Plasmodia.**—*Festschrift Bernhard Nocht, 1937.* pp. 180–184. 1 table. [3 refs.] Hamburg: Friederichsen de Gruyter & Co. [In English].

From studies on malarial parasites of birds it is concluded that *P. cathemerium* has an asexual cycle of about 24 hours, there being a well-marked synchronicity, the greatest number of mature schizonts occurring about 6 p.m. In the other species the periodicity is less marked as there is little synchronicity, and all the asexual stages may be present in the blood at the same time. The asexual cycle of *P. rouxi* seems to be 24 hours, of *P. circumflexum* 48 hours, and of *P. praecox* to vary between 12 and 36 hours. The periodicity of the sexual stages appears to be the same as that of the schizonts, so that the gametocytes of *P. cathemerium* are most numerous in the blood about 6 p.m., at a time when mosquitoes are most prevalent.

It has been shown that by keeping the birds in the dark in daytime and exposing them to light at night, the day-night periodicity can be reversed, but this seems to depend on the time of feeding rather than on the actual exposure to light. The stimulus which leads to production of gametocytes is unknown.—U. F. R.

MARKOV, A. A., KURCHATOV, V. I., & DZASOKHOV, G. S. (1940). Rol' kleshcha Hhipicephalus bursa v rasprostranenii nuttallioza loshadeĭ. [**Part Played by *Rhipicephalus bursa* in the Spread of Equine Nuttalliasis**].—*Sovyet. Vet.* No. 1. p. 33.

Epizootological observations in the Crimea led the authors to believe that both *Hyalomma marginatum* and *Rh. bursa* are concerned in the spread of equine piroplasmosis.

Adult hungry *Rh. bursa* were collected from cows in a district in which nuttalliasis was known to be widespread and placed on a healthy foal in the Moscow district, where there is no nuttalliasis. The animal sickened with typical symptoms. The authors conclude that *Rh. bursa* must be regarded as a possible vector of *Nuttallia equi* both under natural and laboratory conditions.—E. MARTIN.

MARKOV, A. A., ABUSALIMOV, N. S., & KURCHATOV, V. I. (1940). Piroplazmozy koz v Azerbaidzhane. [**Caprine Piroplasmosis in Azerbaijan**].—*Sovyet. Vet.* No. 1. p. 35.

A brief account of illness in a goat, associated with *Babesia ovis* and *Françaiella ovis*.—E. MARTIN.

MARKOV, A., A., & KURCHATOV, V. I. (1940). Issledovaniya po sokhranyaemosti Babesiella ovis v kleshchakh-perenoschikakh. [**Survival of *Babesia ovis* in Vector Ticks**].—*Sovyet. Vet.* No. 1. p. 33.

The authors attempted to infect sheep with *Babesia* by means of ticks which, in their previous generation, had fed on animals unsusceptible to the disease.

In 1937–38 the descendants of a female *Rhipicephalus bursa*, taken from a ram affected with babesiasis, were placed on a horse. The following generation of these ticks caused sheep to sicken with babesiasis. In 1938–39 the next two generations of these ticks (obtained from females fed on horses) were fed on a rabbit and on a calf, and then placed on rams. All the rams sickened with severe babesiasis, and one died.

Thus feeding three generations of ticks on non-specific hosts did not free them from infection, and their descendants remained infective.

The importance of this observation for eradication by pasture rotation is stressed.—E. MARTIN.

RUDD, J. A. (1939). **Ulcerative Spirochaetosis of Pigs.**—*Qd agric. J.* **52.** 295–298. 3 figs.

A well illustrated account of the disease—a wound infection which has been observed in Asia and Africa, as well as in Australia [see *V. B.* **1.** 47; **5.** 129, and **6.** 802].—J. E.

VON DÜRING, W., & HERMS, H. (1939). Zur Diagnose und Therapie der Stuttgarter Hundeseuche. [**Diagnosis and Treatment of Stuttgart Disease**].—*Arch. Wiss. prakt. Tierheilk.* **74.** 127–136. 1 table. [Numerous refs.]

Observations made during three years on serologically established cases have revealed six different types of this disease. (1) Gastroenteritis acuta; condition improved after leptospiral serotherapy and symptomatic medicinal treatment. (2) Nephritis with temporary gastro-enteritic symptoms; serological reaction to *Leptospira canicola* or *L. icterohaemorrhagiae* is positive; serotherapy is unsuccessful in advanced cases. (3) Nephritis combined with myositis and neuritis; leptospiral serologic reaction is doubtful; surprising cures are sometimes observed after serotherapy. (4) Nephritis with distemper-like symptoms and signs of haemorrhagic diathesis. This form is considered to be determined by a mixed infection; the temperature is high. Treatment with *L. icterohaemorrhagiae* serum is the only successful therapeutic measure. (5) Icterus gravis; this is rarely observed in dogs. It develops very rapidly. The symptom of thirst is absent. Leptospiral serotherapy, and insulin and glucose treatment are recommended. (6) Latent affections, which are rare.

Positive serological reactions offer no certainty of the presence of live *Leptospira*; it is not always possible to demonstrate these organisms.—V. CHLÁDEK.

VIOLLE, H. (1939). De la transmission du typhus au porc. Des voies d'inoculation. [**Methods of Transmitting Typhus Fever to Swine**].—*Bull. Acad. Méd. Paris.* **121.** 83–84. [3 refs.]

It is suggested that when using the pig as an experimental animal for the study of typhus, it is better to induce infection by the oral route than by intraperitoneal injection, since the former method is very likely to produce dermal eruptions which in the pig are easily visible.—R. E. GLOVER.

DISEASES CAUSED BY VIRUSES

I. HALDANE, J. B. S. (1939). **Sampling Errors in the Determination of Bacterial or Virus Density by the Dilution Method.**—*J. Hyg., Camb.* **39.** 289–293. 2 tables. [4 refs.]

II. LURIA, S. (1940). Méthodes statistiques appliquées à l'étude du mode d'action des ultravirus. [**Statistical Methods for Ultraviruses**].—*Ann. Inst. Pasteur.* **64.** 415–438. 3 figs., 3 tables. [Numerous refs.]

I. The bacteriological method of estimating the density of a culture by diluting it until a substantial portion of all inoculations are negative is considered from the theoretical standpoint, and H. elaborates an algebraic method for the determination of the error involved in such procedure and of a statistical estimate

of the expected number of virus particles in a unit dose. These results are applied to the data of PARKER [*V. B.* **9.** 316.] and, on the hypothesis that infection can be induced by a single virus particle, close agreement is reached between observed and calculated data. This algebraic method gives a more reliable solution than that given by the graphical method and at the same time affords a measure of the standard error involved in the procedure.

II. The question of the number of particles necessary to provoke infection is considered statistically. L. divides this paper into three parts ; a consideration of the theoretical basis of the necessary statistical methods employed, involving standard methods of calculation of probabilities based on Poisson series ; discussion of the experiences and data of various quoted authors, and the application of the theories to a study of the relationship between the infection titre of a virus suspension and the actual number of particles contained therein. The treatment of the subject, involving a fair knowledge of statistical methods and mathematical forms, leads L. to conclude that infection can be due to the action of a single virus particle, true of viruses in general. Application of this knowledge further leads to the conclusion that the infection titre is related to the number of virus particles present by a factor corresponding to the average " activity " of these particles. The results are finally discussed in the light of recent advances in knowledge of the nature of viruses in general.—ALFRED EDEN.

PYL, G. (1938). Die Haltbarkeit von Virus-Arten in Abhängigkeit von der Wasserstoffionen-Konzentration. [**Stability of Viruses and its Dependence on pH**].—*Behring.-Mitt.* **9.** 6–19. 3 figs., 5 tables. [11 refs.]

P. has found that, although the viability of foot and mouth disease virus is greatest between pH 7·4 and 7·6 and is very slight at pH 6·0 and 11·5, yet it is increased again at pH values below 6·0 and above 11·5 and the virus is infective in this latter acid or alkaline state. It cannot, however, survive neutralization after exposure to such extremes of pH. Vaccine virus is viable between pH 5·0 and 11·5, vesicular stomatitis virus between pH 4·0 and 11·0 and fowl plague virus between 6·0 and 11·0. The last three viruses can survive acidifying or alkalizing beyond the above limits if the medium is again neutralized without delay (within a minute or two), thus differing from F. & M. disease virus. The greater the delay the less the ultimate viability.

This fact can be used in practice for separating mixtures of F. & M. disease virus and other viruses. Other ways of doing this are also referred to.—J. E.

OPPERMANN, T. (1939). Diagnostische, therapeutische und forensische Gesichtspunkte bei heimischen Viruskrankheiten der Pferde. [**Diagnostic, Therapeutic and Forensic Points of View of Virus Diseases of Equines**].—*Dtsch. tierärztl. Wschr.* **47.** 369–372. [8 refs.]

This is a review, useful for reference purposes, of the general properties of the virus diseases of horses and of the special features of each, the following being included :– horse pox (contagious pustular stomatitis), *Brustseuche* (? influenza pectoralis), influenza or *Pferdestaupe* (? influenza catarrhalis), Hoppegarten cough or infectious bronchitis (*Brüsseler Krankheit*), Borna disease, haemorrhagic encephalomyelitis and infectious anaemia.

O. refers to the change in the conception of the nature of viruses, from the idea that they are live organisms to the belief that they are protein compounds and discusses cell tropism, viability, pathogenesis, immunity, virus carriers, immunization and virus-bacterium associations. In the special section each disease is briefly described, as to its incubation period, symptoms, pathology, treatment, and forensic differential diagnosis.—J. E.

LANGNER, H. (1938). Der Seuchengang der Maul- und Klauenseuche 1937/38. [**The Course of Foot and Mouth Disease in 1937-38**].—*Berl. Münch. tierärztl. Wschr.* November 25th. 725–729, and December 2nd. 740–743. 2 graphs, 8 maps.

This is a record, illustrated by maps, of the advance of F. & M. disease in Europe in 1937–38, with particular reference to Germany. The second part of the article discusses the losses and the means used to control them, both collectively and in individual animals.—V. CHLÁDEK.

I. —. (1938). Bayr. Anweisung über die Bekämpfung der Maul- u. Klauenseuche durch Impfung. [**Bavarian Plan for Controlling Foot and Mouth Disease by Immunization**]. *Prag. tierärztl. Arch.* **18.** 37–42.

II. ČERNOVSKY, J. (1938). Bericht über die Tilgung der Maul- und Klauenseuche in Deutschland, Dänemark und Holland. [**Report on the Eradication of F. & M. Disease in Germany, Denmark and Holland**].—*Ibid.* 49–60.

I. There is discussion of the following points :– segregation of healthy from diseased stock, vaccination of healthy stock, methods of spreading the infection artificially, and simultaneous inoculation of bovines with doses for preventive and curative inoculation. Calves, sheep, pigs, and goats, are similarly dealt with, but curative inoculation is not advised.

The clinical manifestations of a case which is considered to have recovered are given ; in uneventful cases final disinfection begins on the 11th day after the commencement of disease.

The section dealing with disinfection is divided into two parts :– (1) disinfection carried out daily while the disease is active, and (2) final disinfection which is carried out after affected animals have recovered. The disinfectants used are discussed.

" Serum-alone ring inoculation " is described. Its success is dependent upon complete inoculations and disinfection.

II. C. describes a tour of these countries to inspect measures taken for the prevention and eradication of F. & M. disease.

Germany employed simultaneous inoculation with convalescent serum and a virus obtained from recently affected animals. Its value is proved by the mild form which the disease takes in animals so treated. The method of procuring an adequate supply of this serum is described.

Slaughter of diseased and in-contact stocks was practised in Denmark, with deep burial of all carcasses, and pasteurization of milk supplies in the restricted areas. Compensation was fixed by a commission on which the farmer was represented.

A description is given of the Research Institute for F. & M. disease on the Island of Lindholm where types of virus and immunity are studied.

The fact that cattle in Holland spend two-thirds of the year on grassland netted with canals prevents the disease from being successfully controlled by the usual sanitary-veterinary police measures. To reduce economic losses active immunization is practised by one of the following processes :– (1) by the old method of rubbing in the vesicular fluid, (2) by simultaneous inoculation, or (3) by inoculation with serum and the permitting of natural infection. Compensation is paid by the State for losses incurred within 14 days of inoculation, provided that the farmer complies with the Picard Frenkel hygienic measures, which are described. C. discusses Frenkel's culture virus and is of the opinion that it possesses great possibilities. A small experiment carried out with this virus is also described.

—G. D. MUNRO.

OPPEL, E. (1938). Maul- und Klauenseucheveränderungen am Pansen des Rindes (Morphologie und Histogenese). [**Lesions in the Rumen in Foot and Mouth Disease**].—*Arch. wiss. prakt. Tierheilk.* **74.** 1–24. 12 figs. [Numerous refs.]

Hitherto the only specific lesions of the mucous membrane of the rumen in F. & M. disease that have been described have been vesicles. O. now describes two types of lesion that are not of this nature. In the first type, foci of hyaline keratinoid degeneration are formed in the deeper epithelial strata, the result being first a thickening of the epithelium and later exfoliation and erosion in the centre of the foci. The other type begins with a swelling of the superficial epithelial strata, with subsequent hyaline keratinoid degeneration. If the lesions do not heal quickly the process spreads to deeper strata with resulting formation of pseudo-membranes and erosions. Both types are characterised by the formation of horny beads in the stratum spinosum.—V. CHLÁDEK.

GERLACH, F. (1938). Ueber den Nachweis granulärer Formen vom Typus der Viruskörperchen bei Maul- und Klauenseuche. [**Demonstration of Granular Virus Bodies in Foot and Mouth Disease**].—*Z. InfektKr. Haustiere.* **54.** 8–22. 15 figs. [4 refs.]

The examination of numerous specimens containing F. & M. virus confirmed the presence of granular bodies which correspond to a marked degree with the virus bodies found in connexion with other virus diseases. Such bodies were never found in the contents of spontaneously formed or artificially produced vesicles in uninfected animals. In order to differentiate non-specific forms, it is recommended that reliance should not be placed on the use of any one staining method. Examination with the fluorescence microscope of material stained with 0·1% primulin solution yields good results. With the ordinary microscope G. recommends staining with eosin methylene blue. The data given by ELFORD *et al.* [*V. B.* **8.** 429.] were not confirmed; the bodies which G. found and considered to be specific were much larger than those described by them.—V. CHLÁDEK.

I. THYGESEN, J. P. N. (1939). Mund- og Klovesygens Smitteforhold. [**The Contagiousness of Foot and Mouth Disease**].—*Medlemsbl. danske Dyrlaegeforen.* **22.** 197–200.

II. ANDERSEN, M. (1939). Mund- og Klovesygens Smitteveje. [**Epidemiology of Foot and Mouth Disease**].—*Ibid.* 243–249.

These are general discussions of possible ways in which F. & M. disease may be transmitted, the second article having special reference to spread of infection between farms situated along roads used by dairy produce vehicles. Instances of infection that developed in this manner are given, but many cases are mentioned of farms remaining uninfected after similar exposure. It is stated that it is usually impossible to incriminate a particular route or medium of infection to the exclusion of others.—J. E.

JERLOV, S. (1939). Bekämpandet av mul- och klövsjukan och persondisinfektionen vid Öresund. [**Control of Foot and Mouth Disease and Disinfection of Persons at Öresund, Sweden**].—*Svensk VetTidskr.* **44.** 72–88. 1 table.

In September 1938, F. & M. disease was rife in Själland, Denmark, and the first cases of the outbreak began to occur in Skåne, Sweden. To hinder the spread of infection across the water an attempt was made to subject travellers from Denmark landing at Öresund to disinfection, although it was recognized by the authorities that facilities for doing this thoroughly could not be acquired without too great a delay for its full value to be obtained.

For three weeks passengers had to wash their hands and faces, have their shoes and baggage wiped and their outer garments brushed and had to walk over a mat soaked in chloramine (later 1 % citric acid was used).

This procedure failed to have any influence on the spread of the disease in Skåne, and so it was discontinued.

J. describes the holiday and business traffic between Själland and Skåne. There seems to be no doubt that F. & M. disease could be transmitted between the two countries through the medium of human beings [and much more so than in the case of the Copenhagen-Malmö route (see *V. B.* **10.** 668)].—J. E.

I. Toussieng, E. (1937). Forsøg paa aktiv Immunisering af Kalve ved Injektion af Mund- og Klovesygevirus i Rygmarvskanalen. [**Active Immunization of Calves against Foot and Mouth Disease by Injection of Virus into the Spinal Canal**].—*Maanedsskr. Dyrlaeg.* **49.** 145–151.

II. Jensen, E. F. (1937). Om Formolvaccine mod Mund- og Klovesyge. [**Formol Vaccine against Foot and Mouth Disease**].—*Ibid.* 262–267.

I. After experiments on g. pigs, T. attempted to confer immunity on calves by intraspinal inoculation of F. & M. disease virus. Three calves which received three or four inoculations showed no resistance when exposed to contact infection, and two other calves developed the disease as a result of the fourth inoculation.

II. A survey of recent work on the problem. Formol vaccine has been used in various countries, but the results have not been very encouraging.

—H. C. Bendixen (Copenhagen).

Cordier, G. (1939). Adsorption du virus aphteux par le charbon d'os et le phosphate tricalcique. Applications à l'immunisation chez le cobaye. [**Adsorption of Foot and Mouth Disease Virus by Bone Charcoal and Tricalcium Phosphate and its Use in Immunizing G. Pigs**].—*Rec. Méd. vét.* **115.** 599–616. 6 tables. [4 refs.]

A 1 % suspension of finely ground infected g. pig pads was prepared in saline buffered to a pH of 7·6. The mixture was centrifuged and the supernatant used for adsorption experiments. While 4–10 % of bone charcoal or 10 % tricalcium phosphate completely adsorbed the virus, vegetable charcoal failed to do so.

After adsorption had taken place the bone charcoal or tricalcium phosphate was centrifuged down, washed twice and resuspended in saline. Sixty g. pigs were given 0·5–1 c.c. doses of the suspension and only four of them developed F. & M. disease. The original unadsorbed material produced the disease regularly when given in these doses. Forty-two of the g. pigs received a second dose 1–4 weeks after the first. About three weeks after the last dose the immunity of the animals was tested by the intradermal inoculation of a 1–3,000 pad suspension. In the group which gave the best results, where two doses of a 2 % pad suspension adsorbed on to 10 % animal charcoal had been given, two out of 13 g. pigs developed generalized F. & M. disease when submitted to the immunity test, although five failed to react to the test dose.—John Francis.

Stroh, G. (1939). Abgeheilte Maul- und Klauenseuche bei Reh und Gemse. [**Cases of Healed Foot and Mouth Disease in Roe Deer and Chamois**].—*Berl. Münch. tierärztl. Wschr.* Dec. 29th. 749–750. 3 figs. [Numerous refs.]

Healed lesions of F. & M. disease were noticed in the feet of two roe deer and one chamois sent separately for examination to Augsburg abattoir. Twenty-two other suspected cases in deer were judged not to be specifically affected. S. considers that deer are not very susceptible to F. & M. disease and that they are, therefore, unimportant as spreaders of the disease in Germany.—J. E.

LE ROUX, G. (1940). Étude comparative de la vitalité du virus dans différents organes de veaux atteints de peste bovine expérimentale. [**Comparison of the Vitality of the Virus in Different Organs of Calves Experimentally Infected with Rinderpest**].—*Bull. Soc. Path. exot.* **33.** 160–167. 6 tables.

R. tested the vitality of rinderpest virus from various organs after different periods under similar storage conditions. The organ pulps and blood were stored in sterile glass tubes kept at 0°C. and the test inoculations of susceptible calves were of 1 g. of pulp or 1 c.c. of blood mixed with 9 c.c. of saline. It was found, as had been observed by other workers, that the renewal of the air in contact with the virus caused its more rapid destruction, and it was thus found necessary to preserve single doses in small tubes so that a fresh tube could be used for each inoculation. The resistance of virus to the renewal of air in contact with it was found to be greater in those organs which had the highest immunizing power. The experiment showed that the vitality of virus was greatest in haemal lymph nodes, lungs, and spleen, in which organs the virus was still active after 24, 22, and 20 weeks respectively (average of five observations). Other organs tested were :– Peyer's patches (12 wks.), blood (10·5 wks.), testicles (5 wks.), liver (4·3 wks.), and thymus (1·3 wks.).

In the animals inoculated the intensity of the febrile reaction showed no variation, but the incubation period increased somewhat with storage of virus. It was thought that this increase was due to progressive attenuation of the virus. The vitality of the virus, as measured, did not correspond exactly with the immunizing power of the organ pulp tested, though there was some relationship. It was suggested that the disintegration of the various tissues took place at different rates and that the products of disintegration of each tissue might have a different effect on the virus.—H. E. HARBOUR.

OLITSKY, P. K., & HARFORD, C. G. (1938). **Intraperitoneal and Intracerebral Routes in Serum Protection Tests with the Virus of Equine Encephalomyelitis. II. Mechanism Underlying the Differences in Protective Power by the Two Routes. III. Comparison of Antiviral Serum Constituents from Guinea Pigs Immunized with Active or Formolized Inactive Virus.**—*J. exp. Med.* **68.** 761–777 and 779–787. 8 tables. [Numerous refs.] [For part I, see *V. B.* **9.** 767].

This investigation was carried out to study the mechanism underlying the variation in the results obtained between an intracerebral and an intraperitoneal injection of a serum-virus mixture [see part I]. The procedure followed was intraperitoneal inoculation of mice 12–15 days old with hyperimmune serum, followed by virus given in the brain, nose, muscles or peritoneal cavity. The results obtained showed that the immunity obtained against virus inoculated into the brain or nose was slight, if any, but that it was good against virus inoculated into the muscles or the peritoneal cavity ; it was also found that even a relatively small amount of antiserum (0·015 c.c.) was sufficient to protect against 1–10 million infective doses of virus if both were given by the intramuscular or intraperitoneal routes, either separately or as a serum-virus mixture. The results obtained appear to be correlated with the path of the virus to the central nervous system which in the case of the intramuscular and intraperitoneal routes includes the blood circulation. It is assumed that the immunity results from the fact that the antibodies circulating in the blood only act when virus is also present, *i.e.* when both virus and antiserum have been inoculated by a route which includes the circulation. If, as is likely, mosquitoes are the transmitting agents, it is thought that these results explain the success in the field of using antiserum as a prophylactic.

The sera in the series of experiments referred to in parts I and II were from animals immunized by injections of active virus, or were from horses infected naturally. For part III, g. pigs were immunized either with active virus or with a formalinized inactive virus and were found to have a high degree of resistance to virus injected intracerebrally. The sera obtained from these g. pigs were found to have a low protective value when serum-virus mixtures were inoculated intracerebrally in mice, but if inoculated intraperitoneally the sera of g. pigs inoculated with active virus exhibited high protection, and those from g. pigs immunized by the use of formalinized vaccine showed only a low protective power, similar to that obtained when mice are inoculated intracerebrally. The possibilities are :– (1) the antiviral body in both cases is a single antibody, the different results being obtained by the different method of inoculation (cerebral or peritoneal) ; (2) two antibodies are involved in the action of the two types of sera, (a) when active virus is used for immunization, infection is induced and multiplication of virus takes place, whereas this does not occur when an inactive formalinized virus is used, and the antigenic stimuli in both instances may evoke different antibodies, detectable by the intraperitoneal test, and (b) the " intracerebral " antibody may be present in both sera and the " intraperitoneal " antibody in greater quantity in serum of animals actively immunized with living virus.—J. A. Griffiths.

Randall, R. (1940). **The Preparation of Equine Encephalomyelitis Vaccine (Chick) by the Army Veterinary School.**—*Vet. Bull. U.S. Army.* **34.** 7–12. [6 refs.]

R. details the technique adopted in the preparation of chick-embryo vaccine. The eggs are incubated for 18–20 hours after inoculation, when 80–90% of the embryos are either dead or immobilized from the pathogenic effects of the virus. The embryos are removed under sterile conditions, weighed and then ground to microscopic fineness by the use of " colloid mills ". Normal saline to make a 20% suspension of the embryo tissue is then added. A portion of this is then taken to titrate the virus content. This is done by the intracerebral inoculation of g. pigs with graduated dilutions of the suspension. The titre of the virus content proved to be at least 500,000,000 guinea pig M.L.D. per g. of embryo. To the suspension of embryo tissue is added 0·4% formalin, and it is then stored at 70°F. to inactivate the virus, after which it is placed in a refrigerator to allow of precipitation of the fine tissue particles. The clear supernatant fluid is decanted and stored at 36°F. for use as vaccine. Tests to ascertain that the virus has been inactivated and that the vaccine is sterile are made. No vaccine is issued for use unless it is capable of protecting g. pigs against 1,000 lethal doses of virus 12 days after they have received two doses of vaccine at intervals of a week. The vaccine must be kept on dry ice in transit and be used expeditiously.

Over 35,000 animals were successfully inoculated without any unfavourable reactions and there were no deaths from the disease among those vaccinated.
—J. A. Griffiths.

Bridré, J., & Martin, L. A. (1939). Vaccination anticlaveleuse : vaccin sensibilisé obtenu par mélange titré virus + serum. [**Sheep Pox Vaccination: Sensitized Vaccine Obtained by a Titrated Mixture of Virus and Serum**].—*Bull. Acad. vét. Fr.* **12.** 291–295. [3 refs.]

Bridré and Boquet formerly used the complement-fixation test to determine the exact quantity of serum necessary to sensitize virus for the preparation of a vaccine. This method was not always satisfactory. Blanc and Martin performed titration on sheep using a mixture of virus and varying quantities of serum,

48 hours after preparation. The object of the present experiment was to ascertain if vaccine so titrated could be considered to be sensitized. A mixture of virus and serum was inoculated into the skin of a sheep at different places and at intervals varying from the moment of preparation up to 24 hours. Virus and normal serum inoculations were also made in control experiments. The results showed that the effects of the vaccine varied greatly according to the time elapsing between its preparation and inoculation. The quantity inoculated had little influence on the result. The authors conclude that a good sensitized virus vaccine can be prepared by titration on sheep by the method employed by BLANC and MARTIN.
—S. J. GILBERT.

TOPACIO, T., ROBLES, M. M., CORONEL, A. B., & SALAFRANCA, E. (1939). **Rabies in Apparently Normal Dogs.**—*Philipp. J. anim. Indust.* **6.** 231–237. 1 table. [5 refs.]

This investigation into the incidence of rabies was carried out because the saliva of infected animals may be infective before symptoms are shown and, according to quotations in the paper, recovery has been known with persistence of virus in the salivary glands for a few days. A search was made for Negri bodies in the brains of apparently healthy dogs (2,005 among 26,937 impounded dogs) during a four-year period. They were present in six of the dogs. Brain from three of these cases was examined by animal inoculation, and one was positive.

In the authors' opinion this result justifies antirabic treatment of animals or human beings after they have been bitten by an " unknown " dog, regardless of the clinical history of the animal inflicting the bite. It is considered that the study further suggests that all dogs taken to the city pound, Manila, should be kept in quarantine and regarded as " exposed animals ", and given antirabic treatment before release.—C. V. WATKINS.

CROCCO, G. (1938). Os morcegos e a raiva no homem e nos animais. [**Bats in Relation to Human and Animal Rabies. (Historical Review)**].—*Bol. Soc. brasil. Med. vet.* **8.** 321–327. [1 ref.]

C. gives some account of earlier historical reports on blood-lapping bats in S. America and of losses of livestock due to their activities. He also refers to articles of his own on the subject in the lay press. Some of the work referred to is apparently not supported by scientific observation.—S. TORRES.

ROBLES, M. M. (1939). **Studies on Phenol-Killed Rabies Vaccine. I. The Protective Value of the Single and Multiple Injections.**—*Philipp. J. anim. Indust.* **6.** 477–485. 5 tables. [4 refs.]

SEMPLE's method of vaccine preparation, with a 4% emulsion of calf brain in physiological saline plus 0·5% phenol, was used for these studies. Intraperitoneal injection in the inguinal region was made on alternate sides for multiple dosage. G. pigs of 250–300 g. were kept in separate lots of ten for each experimental vaccination and for 15 days after test virus injection. The test virus was " fixed " rabbit virus passaged through g. pigs. An interval of 14 days after single vaccination and up to 26 days after multiple vaccination was allowed before the virus test.

Single injections of the vaccine did not possess the same protective value as multiple injections of a total like amount. [A considerable number of g. pigs failed to survive some of the large doses used (10–40 c.c. per kg.) owing to the lethal amount of phenol in the vaccine; this detracts from the value of final percentage rates of survival in the various groups of g. pigs tested.]

R. states that intramuscular injection of the vaccine gave better protection

(75%) than subcutaneous injection (33%). About half of 13 vaccinated g. pigs surviving a first dose of virus failed to withstand a second (larger) test dose. All g. pigs (7) surviving the second virus test withstood a third (larger) virus test dose.
—C. V. WATKINS.

MIÈGEVILLE, J., & ZOTTNER, G. (1938). Rage atypique et maladie d'Aujeszky. [**Atypical Rabies and Aujeszky's Disease**].—*Maroc med.* **18.** 349–350. [1 ref.]

The authors describe a case in a donkey, similar to one described by REMLINGER and ROUMY [*V. B.* **8.** 435.], in which the animal died of rabies although the only symptom shown was a pruritus suggesting Aujeszky's disease. There was an intense and increasing pruritus during which the animal severely wounded itself in biting the thighs, perineum and scrotum. It died and inoculation of rabbits showed the disease to be rabies. Negri bodies were absent.—S. J. G.

REMLINGER, P., & BAILLY, J. (1940). Action compareé des dessiccations lente et brusque sur les virus de la rage et de la maladie d'Aujeszky. [**Comparative Effect of Slow and Rapid Desiccation on the Viruses of Rabies and Pseudorabies**].—*C. R. Soc. Biol. Paris.* **133.** 395–397. [4 refs.]

The authors used the Pasteur method of slow desiccation, and a desiccator jar with quick lime for rapid desiccation. In the slow-method tests infected rabbit cords were treated in the classical manner, while very thinly spread, thick emulsions of cord on a glass slide were used for the rapid desiccation tests.

With the slow method, 4–6 days were needed to reduce the virulence of rabies cord and 200–231 days for pseudorabies cord. With the more rapid method the times were approximately identical, 75–100 days.

The authors have already suggested [*V. B.* **10.** 673.] that the slow method acts by a proteolytic ferment which has a free action upon rabies cord, but is neutralized by another (neurolytic) ferment in pseudorabies cord. They suggest that with the other method of desiccation the action of all ferments in the cord was inhibited.—C. V. WATKINS.

REMLINGER, P., & BAILLY, J. (1939). Sur la lyse du système nerveux central dans la maladie d'Aujeszky. [**Lysis of the Central Nervous System in Aujeszky's Disease**].—*Bull. Acad. vét. Fr.* **12.** 392–395. [2 refs.]

The brains and spinal cords of animals affected with Aujeszky's disease are abnormally soft and may become partially liquefied soon after death. The process commences within 12 hours of death and is not due to putrefactive changes. The authors postulate the existence of a proteolytic ferment, specifically associated with the virus of Aujeszky's disease, which attacks the nervous tissue but does not affect the virus.—R. E. GLOVER.

GREEN, R. G., & EVANS, C. A. (1939). **A Comparative Study of Distemper Inclusions.**—*Amer. J. Hyg.* Sect. B. **29.** 73–87. 4 figs. 3 tables. [Numerous refs.]

An extensive study of the viruses of distemper and of epizootic encephalitis in the fox has convinced the authors that the two diseases can be differentiated on histological grounds. Distemper in the silver fox is typified principally by cytoplasmic inclusions, but nuclear inclusions are also present. In fox encephalitis, on the other hand, only intranuclear bodies are developed. The hepatic cells are frequently affected in fox encephalitis, but distemper virus never produces changes in the liver. Conversely, fox encephalitis inclusions are rarely found in the

tissues which are affected by distemper, *viz*, transitional epithelium of the urinary tract, chromaffin cells of the adrenal medulla, bronchial epithelium, the ducts of the salivary glands, and the pancreas. It is inferred that fox encephalitis affects principally endothelium, whereas distemper virus has a greater affinity for epithelium.

Slight differences are seen in the distribution of inclusion bodies in dogs, minks and ferrets affected with distemper, but morphologically they are apparently identical.—R. E. GLOVER.

GEIGER, W. (1938). Schutzimpfungensversuche gegen die Staupe der Silberfüchse. [**Vaccination of Silver Foxes against Distemper**].—*Behring.-Mitt.* **9.** 94–107. 1 fig., 3 graphs.

Details are given of controlled experiments on young silver foxes, six of which were given dog distemper virus and antiserum followed after six weeks by massive intravenous injections of dog virus. Four of the foxes, which had reacted to vaccination, proved to be immune. Later 125 young silver foxes on a fox farm were immunized in the same way with apparent success. In the case of foxes which were experimentally infected with dog virus, and which died in consequence, the virus was recovered and passed back to dogs. In addition these foxes were found to have pure septicaemic infection with *Salmonella suipestifer*, which, however, did not infect dogs injected with their blood. Certain differences in the clinical disease caused in dogs, and in foxes infected by dog distemper virus, were noted.—J. E.

HABER, P. (1938). Dispersion centrifuge de quelques ultravirus : leur affinité pour les cellules germinatives. [**The Tissue Affinities of the Viruses of Encephalitis, Louping Ill and Fowl Plague**].—*C. R. Soc. Biol. Paris.* **129.** 738–739. [1 ref.]

The viruses of St. Louis encephalitis, louping ill and fowl plague, introduced into the brains of mice, reach the testicles but do not produce visible lesions in the organ. Serial passages from the testicles were successful with fowl plague virus, which rapidly acquired viscerotropic properties, but not with the other viruses.—R. E. GLOVER.

GLOVER, R. E. (1939). **Immunisation of Birds against Fowl Pox and Pigeon Pox Respectively with Viruses Propagated on the Chorio-Allantoic Membrane of the Developing Egg.**—*J. comp. Path.* **52.** 29–46. 8 tables. [17 refs.]

Serial passages of true fowl-pox and true pigeon-pox viruses were successfully made on the chorio-allantoic membrane of the developing hen's egg. The lesions in the egg membrane are described.

Keeping infected egg membrane in broth in the refrigerator was found to be the best means of preserving the potency. Pigeon-pox virus, as grown in the egg, has two advantages, namely, it is obtainable free from bacteria and it can be administered by a parenteral route.

After the 20th serial passage through the egg, the pigeon-pox virus, whilst it had lost some virulence for pigeons, retained its virulence for fowls without producing generalized lesions. The fowl-pox virus showed evidence of some attenuation for fowls after the 15th transfer through eggs. After an intravenous inoculation of pigeons with pigeon-pox egg virus, it was found that the injected virus was recoverable from the organs after 21 days, but not after 50 days. [This information has an important bearing on the problem of carrier infection after vaccination.]

Experimental data on the study of immunity with egg-propagated pigeon

virus indicated that it was as good as the natural virus for the fowl and the pigeon. Pigeon-pox egg virus adsorbed onto aluminium hydroxide did not confer satisfactory immunity in fowls.

The main experiments on immunity with egg-propagated virus consisted of giving one or more doses of pigeon-pox virus to pigeons and fowls and of giving to fowls only, pigeon-pox virus followed by a second dose of fowl-pox virus. In pigeons, a second dose of pigeon-pox virus, one month after the first dose, increased the resistance. In the vaccination of fowls with pigeon-pox virus, where a single dose was employed, the intradermal route gave satisfactory results ; the waning immunity could be reinforced six months later by a second dose of pigeon- or fowl-pox virus, preferably the latter, given intravenously or intraperitoneally.

—S. G. Iyer.

Brandly, C. A., & Dunlap, G. L. (1939). **Studies on Certain Filterable Viruses. II. Immunization Against Fowl Pox with Fowl- and Pigeon-Pox Viruses Cultivated in Vivo and in Vitro.**—*J. Amer. vet. med. Ass.* **95.** 340-349. 3 tables. [Numerous refs.] [See also *V. B.* **8.** 222].

The viruses of fowl pox and pigeon pox were passaged serially through eggs. A strain of fowl-pox virus retained its normal virulence and pathogenicity after 68 successive serial egg passages at irregular intervals, including the use of eggs of other species of birds (duck, guinea fowl, turkey). The pigeon strain was carried through 15 egg passages. The authors obtained growth of the viruses in tissue cultures, although not so abundantly as in eggs. The histology of the membrane lesions is described. The egg-passaged (bacteria-free) virus was found to be superior to skin-lesion (bacteria-contaminated) virus as an immunizing agent of chickens against fowl pox.—S. G. Iyer.

Brandly, C. A. (1939). **Use of the Chicken Embryo in Poultry-Disease Studies.** —*Proc. 7th World's Poult. Congr., 1939.* pp. 246–250. [Numerous refs.] Washington, D.C. : U.S. Dep. Agric. [In English].

This is a general review [see also Burnett (*V. B.* **7.** 525.) and earlier papers by the author (*V. B.* **6.** 133 ; **7.** 22 ; **8.** 222 ; **10.** 177 and preceding abstract)].

B. emphasizes the uses and value of the developing egg in the study of various disease problems, together with the potentialities of experiments with chicken embryo in the elucidation of the role of nutritional, physiological, biochemical and other factors.

Advantages of working with eggs over the orthodox method of employing experimental animals, in virus research, are enumerated. Attention is, at the same time, drawn to limitations in the use of chicken embryo inoculation in the investigation of various disease problems.

The use is discussed of the chick embryo as a source and constituent of tissue-culture media for the propagation *in vitro* of a number of viruses.—S. G. Iyer.

Haber, P. (1938). Étude comparée de deux souches de peste aviaire adaptée à la souris. **[Comparative Study of Two Strains of Fowl Plague Virus Adapted to Mice].**—*C. R. Soc. Biol. Paris.* **129.** 360–362. [3 refs.]

H. and his co-workers have previously described [*V. B.* **7.** 178 ; **8.** 365 and 773.] the visible and microscopic lesions present in the livers of mice inoculated with a Dutch strain of fowl plague. The lesions were principally those of oxyphil cellular inclusions apparently in strict relation to the growth of the virus. This finding was not confirmed by Findlay, Mackenzie, & Stern [*V. B.* **8.** 642.] who used an English strain of fowl plague.

H. tested the effect of these two strains on two groups of 20 mice, half of each group being inoculated intracerebrally and the other half intraperitoneally. Both strains caused death in 3–6 days. The Dutch strain was neurotropic after years of passage through hens and, after 40 further intracerebral passages through ducks treated by intraperitoneal injection with fowl plague antiserum, this strain produced no special symptoms, but produced lesions typical of those previously described. The English strain caused nervous symptoms of a tetanic nature with lesions resembling those of herpes encephalitis in the rabbit. The liver was not obviously affected, but microscopic lesions were present, although sparse and difficult to determine. The oxyphil cell inclusions were larger than those produced by the Dutch strain.—C. V. Watkins.

Vittoz, R. (1938). Peste aviaire de Cochinchine. [**Fowl Plague in Cochinchina**]. —*Rec. Méd. vét. exot.* **11.** 23–35. 1 table. [12 refs.]

Information is given concerning an outbreak of fowl plague in one province of Cochinchina from March to May 1933, causing 90% mortality. Domestic ducks and the " egrets of the rice fields " were not susceptible, but the virus was passaged through a pigeon. The virus survived at 4°C. for 37, but not for 64 days. An L_3 candle filtrate of brain emulsion was infective.

The characteristics of the virus were in most respects the same as those of true fowl plague virus, but the symptoms of the disease resembled those of Newcastle disease. A useful table is given showing the characteristics of the Cochinchina virus compared with those of fowl plague and of the conditions described as " Egyptian fowl plague ", " Ranikhet disease ", and the " pseudo-fowl-plagues " of the Philippines, Korea, Java and Tonkin.—C. V. Watkins.

Hornus, G. J. P. (1940). Psittacose pulmonaire expérimentale de la souris blanche. [**Experimental Pulmonary Psittacosis in the White Mouse**].—*Ann. Inst. Pasteur.* **64.** 97–116. 3 plates. [12 refs.] [Translation of author's summary].

(1) Pulmonary psittacosis in white mice is easily caused by means of nasal instillation of the virus. It is transmissible without any change in the virus.

(2) Pulmonary psittacosis of the mouse is essentially characterized, histopathologically, by a monocytic alveolitis, associated in varying degrees with oedematous and congestive lesions.

(3) The elementary bodies are easily distinguishable in stained sections ; they are abundant not only in the cells of the mesodermic alveolar endothelium, but also in the cells of the ectodermal bronchial epithelium.

Magill, T. P., & Francis, T., Jr. (1938). **Antigenic Differences in Strains of Epidemic Influenza Virus. I. Cross-Neutralization Tests in Mice. II. Cross-Immunization Tests in Mice.**—*Brit. J. exp. Path.* **19.** 273–284 and 284–293. 1 table, 4 charts. [13 refs.]

I. The results and significance of cross-neutralization tests performed with 24 strains of influenza virus are discussed. On these results a rough grouping of these strains was attempted ; those strains more closely resembling each other were recovered from the same epidemic of influenza, although serologically different strains could also be recovered from the same epidemic. These antigenic differences between strains have, apparently, not arisen from variations occurring during animal passage or artificial cultivation. It is suggested that the structure of the virus of epidemic influenza is a mosaic of antigens, numerous strains containing the same antigens arranged in such a way that each strain is characterized by its

own peculiar antigenic pattern. Nor would it appear that all strains contain all the antigenic components of other strains.

II. Cross-immunity tests were carried out with 16 strains of epidemic influenza virus and one of swine influenza virus in actively immunized mice. The antigenic differences in strains, reported in I, are also reflected in a lack of cross-immunity. The importance of the serological and immunological strain differences to the problem of epidemiology and prophylaxis is discussed.—A. E.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

BHATTACHARJEE, J. (1939). **A Check-List of the Ectoparasites of the Domesticated Animals in Burma.**—*Indian J. vet. Sci.* **9.** 437–442. [11 refs.]

B. gives a check-list of lice, fleas, ticks, and mites, collected from domesticated animals, including poultry, in Burma. The parasites were all identified from the collections of the Veterinary Research Laboratory, Insein, Burma. The biting louse, *Heterodoxus longitarsus*, stated by PLOMLEY and THOMPSON [(1937). *Nature, Lond.* **140.** 199.] to be primarily a parasite of certain marsupials, was found to be very common in dogs in many districts.—R. FISHER.

SCHWARTZ, E. (1939). Praecipitatiós kísérletek polysaccharidaantigénnel gastrophilosis esetén. [**Precipitation Experiments with Polysaccharide Antigens in Cases of** *Gastrophilus* **Infestation**].—*Thesis, Budapest.* pp. 15. 3 tables. [Numerous refs.] [German summary].

S. attempted to use a polysaccharide fraction prepared from *Gastrophilus* larvae according to the method described by CAMPBELL [*V. B.* **8.** 372; **9.** 783 and 786.], as an antigen for a diagnostic precipitation test for *Gastrophilus* infestation.

Results were inconclusive. All but three of 73 horses subjected to the test gave a positive reaction, although *Gastrophilus* larvae had been found in the stomach and small intestine of only 21 animals. It is not known whether positive reactors harboured larvae in some other organ.—E. MARTIN.

SONI, B. N. (1939). **Damage to Hides Caused by Cattle Ticks in India.**—*Indian J. vet. Sci.* **9.** 361–365. 3 figs. on 1 plate. [2 refs.]

In order to ascertain the extent and nature of the damage to hides from tick bites, a hill bull was infested with young larvae of *Boophilus australis* and *Hyalomma aegyptium*. It was slaughtered after 30 days, and hide samples from six regions of the body were removed for examination, both while still fresh and after the hide had been tanned. All of the samples were tick marked. The marks appeared as minute pits on the grain side of the tanned hide. Finishing and polishing did not remove them.

Tick damage to hides and subsequent loss of revenue appears to be as serious in India as in the United States. Dacca, in Bengal, and the Malabar coast are the areas worst affected in eastern and southern India in this respect. The United Provinces, Punjab and the North-West Frontier Province are also severely affected. About 25 % of hides from these areas are reduced 50–60 % in value by tick damage.
—D. D. OGILVIE.

JOYEUX, C., & SAUTET, J. (1939). Contribution à la biologie de *Linognathus setosus* (Olfer, 1816) pou du chien. Son aptitude à piquer l'homme. [**The Biology of the Dog Louse** *L. setosus*].—*Bull. Soc. Path. exot.* **32.** 618–621.

Young and adult forms of *L. setosus* were found to feed slowly on man and to

emit a drop of faecal fluid during the process, thus facilitating the transmission of any parasitic disease. The authors have previously found [*V. B.* **9.** 235.] *Leishmania* and *Herpetomonas* bodies in the gut of lice collected from a dog with leishmaniasis. Lice tend to leave the host, however, when the extensive furfuraceous dermatitis, typical of leishmaniasis, develops.—M. L. Bingham.

Hobmaier, A., & Hobmaier, M. (1940). **On the Life-Cycle of** *Linguatula rhinaria*. —*Amer. J. trop. Med.* **20.** 199–210. [12 refs.]

The authors observed natural infections of brown rats with *L. rhinaria* and successfully infected ground squirrels. Both these rodents may act as intermediate hosts. Free nymphs could not be found in infected animals which were dissected immediately after being killed. It is concluded that self-liberation only occurs after the death of the host.

The longevity of the adult parasite in dogs is about two years. The parasites are usually situated in the folds of the mucous membrane of the anterior part of the lower concha. Eggs first appear in the nasal secretions in the sixth month after infection; the shedding of eggs continues at irregular intervals throughout the life of the female parasite. Dogs become infected by nymphs invading the oral cavity; those reaching the intestine are usually digested. Swallowed eggs hatch in the intestine, but the larvae fail to develop. The dog is not a normal host for the nymphs.

Nymphs may invade the nasal cavities of cats, but are expelled after about nine days. The feeding of eggs to birds (pigeons) results in the formation of nodules containing debris of first stage larvae. Eggs are discharged unaltered by poikilotherm animals (lizards). Fishes digest the nymphs.—R. P. Hobson.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Kudinov, A. F. (1938). Izuchenie partsial'nogo metoda polnykh hel'mintologicheskikh vskrytii sel'skokhozyaistvennykh zhivotnykh. [**An Economical Method for** *Post-Mortem* **Examination for Helminths in Domestic Animals**]. —*Trud. vsesoyuz. Inst. Helmintol.* **3.** 82–96. 2 figs., 6 tables. [2 refs.] Moscow: Sel'khozgiz.

This is mainly a description of a mechanical mixer which is stated to ensure the uniform distribution of parasites throughout the material to be examined, thus permitting helminth counts to be made on samples only. The materials are diluted with a tenfold volume of water, thoroughly mixed in the mixer and drawn off in ten equal portions through a tap placed near the bottom of the mixer.

The count is made from the fifth portion and it is claimed that, unless the total number of parasites is very small, the average margin of error as compared with a total count is only 2·8%.—E. Martin.

Srivastava, H. D. (1939). **The Important Helminth Parasites of Poultry—Their Treatment and Control.**—*Indian J. vet. Sci.* **9.** 393–409. 4 figs. on 2 plates.

S. gives a general account of the different groups of worms which are known to infest poultry, and of the diseases they cause. The comparative action on tapeworms of kamala and colloidal iodine preparations is discussed; S. recommends treatment with 1 oz. of a 10% aqueous solution of "iodine vermicide" (Merck), introduced *via* the oesophagus into the gizzard. This treatment is repeated in 3–4 weeks.

In the treatment of ascaridiasis, it is claimed that the toxicity of nicotine sulphate can be reduced by mixing with it Lloyd's alkaloid reagent—a special type of fuller's earth [WOOD & LA WALL (1940) "United States Dispensatory." p. 583. London: J. B. Lippincott Co. (22nd Edit.)]

The role played by *Heterakis* spp. as vectors in blackhead of turkeys, and the development of resistance by chickens to infestation with *Ascaridia* and its ill effects, are also referred to in this article.—S. G. IYER.

TAYLOR, W. (1937). **Investigation into the Most Effective though Economic Methods of Combating Different Types of Parasitic Infections in Ruminants, Concurrently with Experiments to Determine Whether Certain Mineral and Protein Deficiencies Tend to Lower the Animal Resistance towards Parasitic Infestation.** *Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 10–18, 3 tables. Discussion pp. 18–19.

Experiments were conducted in the Punjab consequent upon the increasing helminth infestation in cattle and sheep in the region of the Deg Nullah (a loop of the Ravi river), subject to water logging which affects grazing conditions and the quality of the fodder. The influence on the effects of parasitism of feeding a well-balanced ration, and rations consisting of grass from the Deg Nullah area, from adjacent areas, and from normal areas, to 20 calves and 20 sheep naturally infested with helminths, was investigated, and also the value of anthelmintic treatment. The sheep were found to harbour greater numbers of worms than the cattle, *Haemonchus* being the most common.

Various combinations of drugs such as butea, kamala, *Embelia* infusion, copper sulphate, ferrous sulphate, aloes and turpentine oil were employed with or without purgatives. Anthelmintic treatment was repeated at intervals of about five weeks. Copper sulphate administered two days after kamala was found to be the most effective. *Trichuris* infestation in sheep was least responsive to treatment.

The importance of good rations is stressed, as it was found that anthelmintics were more effective in animals fed the well-balanced diet and grass from normal areas; animals receiving rations poor in minerals and proteins appeared to have a decreased resistance to parasitic infection.—S. G. IYER.

RAWA, H. S. (1939). **Intestinal Paramphistomiasis of Sheep in Sind (A Preliminary Report).**—*Indian J. vet. Sci.* **9.** 425–429. [6 refs.]

A serious outbreak of parasitic enteritis in sheep due to immature forms of paramphistomes is described. No snails were found on the grazing ground, but the flock had been on low lying, marshy land. Treatment with carbon tetrachloride was effective, the usual precautions being necessary in the administration of this drug.—M. L. BINGHAM.

SCHMID, F. (1939). Beitrag zur Aetiologie und Diagnostik der Hautblutungen ungarischer Pferde. [**Aetiology and Diagnosis of Cutaneous Haemorrhage in Hungarian Horses (Filariae)**]. *Z. Veterinärk.* **51.** 183–185. [19 refs.]

S. examined several Hungarian horses affected with "blood sweating", the symptoms being similar to those observed by EALLER [*V. B.* **9.** 873]. A thick film of freshly discharged blood from one of the horses revealed ten motile microfilariae, but preparations of clotted blood were negative.

The larvae of *Parafilaria multipapillosa* (*Filaria haemorrhagica*) are laid outside the host's body, and only in rare instances reach the peripheral blood. Accordingly, examination of venous blood will prove negative in the vast majority of cases. Blood freshly discharged from a lesion must be examined if the larvae are to be found.

S. concludes that the freedom of native German horses from this infestation may prove to be due to the absence of the vector, which is not at present known.
—A. L. WILSON.

LATTEUR, J. P. (1939). Bijdrage tot de behandeling van strongylose. [**Treatment of Equine Strongylosis**]. *Vlaam. Diergeneesk. Tijdschr.* **8.** 135–144. 3 tables. [English, French and German summaries].

For diagnosis, L. recommends a combined study of faecal egg count and blood picture to detect the presence of eosinophilia. For treatment, he tested carbon tetrachloride, a pentavalent arsenical, a mixture of oil of chenopodium, chloroform, and castor oil, and aspidinol with filicic acid, on 14 horses. The last mentioned appeared to be the most effective.—A. W. MÖLLER.

REIS, J., & NOBREGA, P. (1938). Sobre as lesões produzidas pela "Capillaria perforans" Kotlán e Orosz nas aves domesticas. [**Lesions Produced in Guinea Fowls and Pheasants by** *C. perforans*]. *Arq. Inst. biol., S. Paulo.* **9.** 21–24. 11 figs. on 4 plates. [2 refs.] [English summary].

The authors report the occurrence of *C. perforans* in guinea fowls and pheasants, causing serious losses in the former. P.M. examination demonstrated great dilatation of the crop and sometimes of the whole oesophagus. There was croupous inflammation of the mucous membrane, which in many cases was thrown into folds covered with papillae which were visible to the naked eye. In some cases the inflammation reached the mouth, and necrosis of the tongue was found.

Although the parasites were very large, up to 15 cm. in length, they were not always easily found as they were embedded in the submucous connective tissue and even in the muscular layers.—MILLER WATSON.

SRIVASTAVA, H. D. (1939). **An Unrecorded Nematode Parasite of the Indian Domestic Pigeon with Remarks on** *Ornithostrongylosis*. *Indian J. vet. Sci.* **9.** 191–194. 3 figs. on 1 plate. [14 refs.]

A number of pigeons died in quick succession in 1936–37 at the Veterinary Research Institute, Mukteswar, India, and on P.M. examination all of them were found to carry a heavy intestinal infestation with roundworms. These conformed to the description of *O. quadriradiatus*.—S. G. IYER.

DATTA, S. C. A. (1936). **"Khoojlee" or Lichen tropicus of Horses.** *Horse Breeding.* **12.** 57–58. 2 figs.

This condition, commonly known as "prickly heat", occurs during the warm season in India; it is non contagious and recurs in affected horses year after year. It takes the form of small papular swellings on the sides of the neck, shoulders and around the tail, having the appearance of whitish patches.

D. claims to have found microfilariae in sections of affected skin from over 20 horses. Their identity was not determined.—J. E.

SRIVASTAVA, H. D. (1938). **The Occurrence of an Unrecorded Filarid Nematode,** *Onchocerca cervicalis* **Railliet and Henry, 1910, in the Ligamentum Nuchae of Horses in India.** *Indian J. vet. Sci.* **8.** 249–250. [4 refs.]

S. records the occurrence of adult *O. cervicalis* in large numbers in the ligamentum nuchae of three horses which were also affected with "prickly heat". Small, hard, calcareous nodules from the size of a pin head to that of a pea, were found in the ligament, and usually the parasites had their anterior ends buried in

these nodules. Recently DATTA [see preceding abstract] demonstrated the presence of an unsheathed microfilaria in sections of affected skin from over 20 cases of "prickly heat" in horses.—J. A. GRIFFITHS.

IMMUNITY

VAN DER SCHAAF, A. (1939). Tuberculose-diagnostiek bij het rundvee. (Het gebruik van S.M. tuberculine GLOVER bij de bestrijding van de runder-tuberculose in Ned.-Indië en de diagnostische moeilijkheden hierbij ondervonden door besmettingen met den tuberkelbacil van het humane type). [**Diagnosis of Tuberculosis in Cattle**].—*Geneesk. Tijdschr. Ned.-Ind.* **51.** 3462–3473. 2 tables. [4 refs.]

After an account of methods of diagnosis and control of bovine TB. in Holland, the Dutch East Indies and elsewhere, the author gives the results of his comparative tests with the ophthalmic method using old tuberculin and with the English double intradermal method using synthetic medium tuberculin.

With 172 cattle in which tuberculous lesions were found P.M., the ophthalmic test (O.T.) gave 41 positive (+), 48 doubtful (±), and 83 negative results (—), whilst the double intradermal test (D.I.T.) gave 140 +, 29 ±, and 3 — results.

With 204 cattle found free of TB. after death the O.T. gave 7 +, 20 ±, and 177 — results, while the D.I.T. gave 22 +, 44 ±, and 138 — results.

S. discusses causes of non-specific reactions and records two cases of human type TB. in cattle in the Dutch East Indies.—J. E.

JØRGENSEN, M. (1939). Lidt om Tuberkulinreaktionernes Forløb hos Kreaturer, der antages at vaere inficeret med Tuberkelbakterier af aviaer Type. [**Tuberculin Test Reactions in Cattle Infected with Avian Type Tubercle Bacilli**].—*Medlemsbl. danske Dyrlaegeforen.* **22.** 595–605. 8 tables, 2 graphs.

J. gives his experience of repeated tuberculin tests of cattle which on the initial test with bovine tuberculin gave a doubtful reaction, whereupon, according to Danish practice, the animals were retested simultaneously with bovine and avian tuberculin. He tested 311 cattle in this way over a period of five years and thereby identified 256 cases of avian type infection. He further studied the reactibility of these animals to both tuberculins over periods of from 3–27 months and gives the results in a number of tables. In all cases in which avian type TB. was diagnosed at the first simultaneous test subsequent reactions were of the same order, with a general tendency for them to dwindle and become negative, but the process might take a few years. This indicates that avian type TB. in cattle tends to die out spontaneously.

It was further found that the skin measurement figures for the two tuberculins in serial observations in the same animal took a parallel course when plotted on a graph, and in one case in which the avian reaction bent upward, the bovine tuberculin reaction did likewise and even surpassed the minimum measurement (increase of 2 mm.) for a positive reaction.

J. emphasizes the importance of tuberculin testing in a given district being carried out continuously by the same veterinary personnel, because continuity in records is so important in the work. A sudden single test by a stranger is likely to cause great confusion in the work and cause unnecessary trouble to farmers. —J. E.

MATTHIESEN, C. C., & JESPERSEN, K. W. (1938). Tuberkulinprøven og Svin med aviaer Tuberkulose. [**Tuberculin Tests on Swine Infected with the Avian Type Tubercle Bacillus**].—*Medlemsbl. danske Dyrlaegeforen.* **21.** 99–104.

Tuberculosis was found to be common in pigs sent to Odense export abattoir, so the pig feeders were advised to have their pigs tuberculin tested. This was done on many farms, but few reactions to bovine type tuberculin were obtained. TB., however, still occurred commonly in the tested pigs.

The authors applied the tuberculin test using both bovine and avian tuberculin to 30 pigs before slaughter. TB. was found in 16 of which 14 reacted to avian tuberculin and none to bovine tuberculin. Avian type infection was verified culturally in eight cases.

In one of the two false negative reaction cases the lesion was healed, but in the other it was active: it thus appears that the tuberculin test is essentially not as reliable in swine as in cattle, even when homologous type of tuberculin is used.
—J. E.

CORPER, H. J., & COHN, M. L. (1939). **The Effects of Tuberculoprotein.**—*J. Amer. med. Ass.* **112.** 403–408. 2 figs., 2 tables. [16 refs.]

Filtrates of virulent human tubercle bacilli from synthetic media freed from bacteria by Seitz filters, highly concentrated Seitz filtrates (by ultradialysis), alum-treated filtrates and the trichloracetic, acid-precipitated tuberculo-protein, were all ineffective in producing specific immunity against virulent human TB. The highly concentrated filtrates and the precipitated tuberculo-protein possessed no appreciable primary toxicity for normal g. pigs. A primary intravenous injection of large amounts of Seitz filtrates, highly concentrated filtrates or precipitated tuberculo-protein into normal g. pigs caused no sensitivity to a second intra-cutaneous injection of up to 0·1 mg. of either filtrate or tuberculo-protein, but in tuberculous g. pigs reactions could be obtained with as little as 0·000005 mg. of the same material. A primary injection of about 2 mg. tuberculo-protein (as the normal or concentrated Seitz filtrate or as the precipitated protein itself) sensitized g. pigs to a lethal intravenous dose (anaphylactically) of as little as 1 mg. tuberculo-protein in these forms, confirming previous work on the difference between cutaneous and anaphylactic reactions. [ZINSSER, H. (1921 & 1926). *J. exp. Med.* **34.** 495, and **44.** 753.] Cutaneous hypersensitiveness to tuberculo-protein was produced by small amounts of avirulent human bacilli; with the latter the picture is complicated by factors of multiplication and tuberculous development. Inconclusive attempts were made to produce specific immunity with tuberculo-protein.—ALFRED EDEN.

URBAIN, A., THIÉRY, J. P., NEVOT, A., & COURTADE, R. (1940). Titrage *in vitro*, et *in vivo* de la mallein. [**Titration of Mallein** *in vivo* **and** *in vitro*].—*C. R. Soc. Biol. Paris.* **133.** 344–345. [3 refs.]

The authors employed the serum of a horse, which had received a single subcutaneous injection of an emulsion of glanders bacillary bodies in a mixture of 1 part of lanolin, 4½ parts of olive oil and 4½ parts of vaseline, for the titration of samples of mallein of varying antigenic value by the complement-fixation reaction. The results of these tests were confirmed by the intradermo-palpebral injection with strongly and weakly antigenic malleins of six horses, which were strong positive reactors to the mallein test. The six test horses showed typical glanders lesions at autopsy. The use of a potent glanders antiserum was advocated for the *in vitro* titration of mallein since with it results were obtained which coincided with those of *in vivo* titration.—R. O. MUIR.

NUSSER, I. (1939). A brucellózisos fertőzöttség megállapítása a tárgylemezes agglutinációs próbával. [**Diagnosis of Brucella Infection by means of the Rapid Agglutination Test**].—*Thesis, Budapest.* pp. 11. 6 tables. [11 refs.] [German summary].

The blood serum of 7% of 1,540 cattle from various small farms reacted to the rapid agglutination test. In a comparison with the tube test there was agreement in 95%.—E. MARTIN.

VIRIDÉN, P. (1938). Några fall med missvisande blodprovsreaktion vid smittsam kastning hos nöskreatur. [**Erroneous Blood Test Results in Bovine Brucellosis**].—*Svensk VetTidskr.* **43.** 243–247.

V. describes the introduction of *Br. abortus* infection into a clean herd by a cow which was bought late in gestation after having passed the agglutination test. The cow calved normally and was only detected as infected by an aggln. test made ten weeks later.

Two other similar instances are also described. Diagnosis was confirmed by bacteriological examination of the foetal membranes.—J. E.

CALDER, R. M. (1940). **Modification of Huddleson's Opsonocytophagic Reaction.** —*J. Lab. clin. Med.* **25.** 769–770. [1 ref.]

The modification briefly consists of spreading a thick film of blood after the usual incubation of blood and organisms. The red cells are dissolved by immersing the slides for several minutes in 1% acetic acid in distilled water. The slides are stained with Bordet-Gengou's carboltoluidine blue. The leucocytes and bacteria stand out as deeply stained structures against a faint blue background. Before use, the slides are washed in soap and hot water and then in an automobile anti-freeze solution.—S. J. GILBERT.

CAMERON, H. S., & MCOMIE, W. A. (1940). **The Agglutination Reaction in** *Corynebacterium ovis* **Infection.**—*Cornell Vet.* **30.** 41–46. 1 table. [4 refs.]

Owing to the insidious nature of caseous lymphadenitis and the frequent absence of external lesions, the authors attempted to evolve a serological test which might ultimately detect infected animals. The agglutination test was compared with the intradermal test. *C. ovis* tends to undergo spontaneous flocculation, but a reasonably stable suspension was prepared by washing the 48-hour growth off agar with 0·85% saline, shaking the suspension with glass beads in a mechanical shaker for 30 minutes, centrifuging lightly and using the supernatant liquid as the suspension. It was found that certain strains flocculate more readily than others.

The material for intradermal inoculation was prepared from a culture of *C. ovis* grown in beef heart infusion broth for 34 days at 37°C. It was concentrated by evaporation and filtered. The injections were made in the skin of the axilla. Sera of old sheep, "feed lot lambs" and beef cattle gave varying positive reactions. There was a significant difference between the reactions of old sheep and lambs. Forty-five old sheep were tested intradermally; eight reacted, four of which had external lesions. Two cases with external lesions did not react.

These findings were not checked by P.M. examinations; nevertheless, the authors consider that diagnosis of infection may be possible by serological or allergic means.—D. L. HUGHES.

SCHMIDT, W. (1938). Die Frage der Blutuntersuchungen im Rahmen des Geflügelgesundheitsdienstes. [**The Agglutination Test for** *Salmonella pullorum* **Infection**].—*Arch. Geflügelk.* **12.** 241–245. [English summary].

The rapid agglutination test for pullorum disease has proved no less reliable in practice than the test tube agglutination test.—SASSENHOFF.

BROWN, H. C. (1939). **A Rapid Presumptive Serological Test for Weil's Disease.** —*Brit. med. J.* Dec. 16th. 1183–1184. 1 fig. [3 refs.]

In the ordinary agglutination technique for leptospiral infection, dilutions of the serum are incubated with a formolized suspension of *Leptospira*, and B. allows the serum and suspension to interact over night. By the technique now described a fairly reliable result can be obtained in 15 minutes, although the agglutination titre of the sera of experimentally infected rabbits is only a third of that given by SCHÜFFNER's standard method.

The strain of *Leptospira* should be carefully chosen, as the agglutinability of strains varies considerably. The method depends on obtaining a thick suspension of organisms, which cannot be done by simple centrifuging of cultures. After adding formalin to cultures to a concentration of 0·2 %, saponin is added to make a concentration of 1 : 1,000. The material is then centrifuged at high speed for ten minutes, the deposit collected and suspended in saline to make an opacity about equal to that of a No. 1 Wellcome opacity tube. This suspension is then centrifuged at about 3,000 revolutions a minute for 10 min. to remove clumps of organisms. The suspension is next mixed with the varying serum dilutions on a slide, rocked for 10 min. and the results read with a hand lens against a dark background.—U. F. RICHARDSON.

I. SORDELLI, A. (1938). **Assay of Three Tetanus Antitoxins.**—*Bull. Hlth Org. L. o. N.* **7.** 733–738. 10 tables. [1 ref.]

II. SMITH, M. L. (1938). **The Standardisation of Tetanus Antitoxin : Factors Influencing the Assay.**—*Ibid.* 739–769. 14 tables. [8 refs.]

III. IPSEN, J., & ROSTOCK, O. (1938). **Comparative Assays of International and American Standard Tetanus Antitoxins with Washington and Copenhagen Test Toxins.**—*Ibid.* 770–775. 1 table. [2 refs.]

IV. ANON. (1938). **The Results of Twenty Different Assays of Five Samples of Tetanus Antitoxin.**—*Ibid.* 776–782. 2 tables. [1 ref.]

I. In an assay of three tetanus antitoxins, S. found that the relationship between them was only valid for toxins of identical constitution. The results are all given in tables.

II. Among the factors influencing the assay of tetanus antitoxin are the toxin used, the species of test animal, the route of injection and, to a smaller extent, the length of the interval for which toxin and antitoxin are allowed to react before injection. To select sera of good therapeutic value the following suggestions are made :– (1) the standard antitoxin should give as steep a dose response curve as possible ; (2) groups of six g. pigs or mice for each mixture should be used ; (3) an interval of one hour after mixture of toxin and antitoxin is better than a longer period ; (4) intravenous injection is somewhat better than the subcutaneous ; (5) g. pigs distinguish between dissociating and non-dissociating sera better than mice ; (6) the 0·05 unit level is as good as the 0·2 unit level, and (7) there are advantages in selecting a test dose of toxin which, when mixed with standard antitoxin, will only cause tetanus but not death within six days.

III. The authors have made investigations to determine whether the desirable and standard relationship of 1 : 2 between the international unit and the American unit still holds when the method of assay is altered. Two toxins were used, with mice and g. pigs as experimental animals, and the toxin-antitoxin mixtures were allowed to combine for one hour and 24 hours.

With one toxin the American standard antitoxin appeared to be stronger by 6 % than the international standard, but with the other toxin the international standard was 12 % stronger than the American standard.

With the shorter interval after mixture of toxin and antitoxin there was a decrease of the test dose against both standard antitoxins, but this did not alter the relative activity of the two sera. The difference in results of tests in mice and g. pigs was not statistically significant.

The differences due to the test toxin used are the only ones which are of any significance, and if various toxins are to be employed for the comparison of the two standards, the international unit can never be exactly half the American unit, as variations cannot be excluded.

IV. The results of these 20 different assays of tetanus antitoxin further confirm the findings in the preceding three reports, namely, that the variations are about the same whether g. pigs or mice are used, and that the toxin employed is the most important factor influencing variation in assay.—D. L. Hughes.

Evans, Florence L. (1939). **The Action of Bacterial Toxins of Embryonic Chicks.** —*J. Immunol.* **36.** 395–397. [1 ref.]

0·1 c.c. of toxic filtrates from *Clostridium botulinum*, Types A and B, and *Cl. tetani*, containing 1–10 g. pig M.L.D., was injected by a modification of Goodpasture's technique on to the chorio-allantoic membrane of chick embryos 7–14 days old. The proportion of chicks hatching from the experimental eggs was the same as that hatching from broth-injected and uninjected control eggs. No experimental embryo which died in the course of incubation showed lesions due to toxic action.—R. O. Muir.

DISEASES, GENERAL

I. de Kock, G. (1938). **Recent Research Regarding Tropical and Subtropical Diseases in the Union of South Africa.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 734–751. [13 refs.] [In English: French, German and Italian summaries. Discussion pp. 808–809 in English and French].

II. Daubney, R. (1938). **Newer Researches Regarding Tropical and Subtropical Diseases.**—*Ibid.* 752–764. [Numerous refs.] [In English: French, German and Italian summaries. Discussion pp. 808–809 in English and French].

I. The author summarizes briefly the subtropical diseases, which have been a subject of research in the Union of South Africa, under the following headings :–

(1) Virus Diseases. (a) *Horse sickness.* The losses were less than 1% in immunizing 100,000 horses and mules with the mouse-adapted strains (so-called "neurotropic virus"). A single subcutaneous injection was used. Investigations indicate that mosquitoes are not vectors of horse sickness. (b) *Blue tongue* virus, recovered from cattle, was propagated in sheep. The virus was not attenuated by 15 passages through sheep vaccinated against blue tongue, and, although the immunity of these sheep was broken down, no mortality occurred. Although cattle showed no symptoms, they remained carriers of the virus for 22 days after inoculation. Sheep in similar circumstances were virus carriers for up to 60 days. The virus cannot be transmitted to or maintained in small animals. (c) *Swine fever.* The author thinks that there is a relationship between the European and African swine fever. He considers that European virus has been propagated as well as modified in wild pigs and is now responsible for periodic outbreaks. [In the discussion, speakers did not agree that this applied to the form of the disease met with in tropical Africa].

(2) Rickettsiasis. *R. ruminantium* could not be transmitted to small animals.

In many attempts there was failure to isolate a specific *Proteus* from sheep infected with heartwater, and in every case a Weil-Felix reaction was negative. *R. conjunctivae* may play a part in the causation of infectious conjunctivitis in ruminants.

(3) PROTOZOAL DISEASES. (a) *East Coast fever.* Reference is made to the role of *Theileria mutans* infection in E.C.F. areas and in areas free from the disease. It is said that the normally harmless *Th. mutans* may cause mortality and a pathological picture indistinguishable from E.C.F. The control of E.C.F. has been complicated by the occurrence of single deaths of animals in whose tissues Koch's bodies were found in smears, and great difficulty was experienced in deciding whether in E.C.F. areas these deaths were due to *Th. parva* or *Th. mutans.* [Koch's bodies are found in a number of cases in some non-E.C.F. areas, particularly in north-eastern Rhodesia and in Nyasaland]. In South Africa it is believed that, under natural conditions, *Th. mutans* remains a harmless parasite, and that it is only exceptionally that Koch's bodies are found in single cases. In outbreaks where this has occurred, the quarantine measures are now removed after a nominal period of control.

(b) *Trypanosomiasis.* The immediate effect of the destruction of large numbers of tsetse flies (*Glossina*) by the Harris trap in a part of Zululand was the disappearance of nagana. " There is no doubt that the Harris trap efficiently used is of enormous value for the control of nagana in Zululand and will, in all probability, lead to the complete disappearance of fly in the Zululand ' fly belt ' ". In parts of South Africa tests for dourine, using the complement-fixation reaction, revealed a large percentage of positive reactors, but a large proportion of these did not show the characteristic symptoms even under prolonged observation. The test is said to have given excellent results in horses but to have been very unsatisfactory in mules and donkeys. In South Africa the disease is responsible for a very low mortality and clinical symptoms are not characteristic.

(c) *Eperythrozoon ovis infection.* According to NEITZ (1937), this causes pyrexia, icterus and anaemia in sheep.

(4) BACTERIAL DISEASES. *Anthrax* is controlled in South Africa by the annual inoculation of cattle on infected and in-contact farms. A saponin vaccine has given fairly satisfactory results. *Tuberculosis* occurs mainly among dairy herds in urban areas, but the disease may spread in herds under ranching conditions. The disease has been found to occur among wild ruminants (the kudu and other antelopes are mentioned). An eradication campaign is being instituted.

II. The natural distribution of East Coast fever in Kenya corresponds closely with that of the chief vector, *Rhipicephalus appendiculatus.* Outbreaks, however, also occur outside the areas which offer optimum climatic and soil conditions for *R.a.* and in these *R. capensis* or *Hyalomma impressum* (near *planum*) and *H. anatolieum* may be vectors as well as *R.a.* D. refers to METTAM's work [*V. B.* **7.** 169.] on the presence of Koch's " blue bodies " or schizonts in the brains of cattle affected with " turning sickness ", a disease not uncommon in enzootic E.C.F. areas of East Africa. Ticks feeding on animals affected with this disease could after moulting transmit E.C.F. to a susceptible animal. Koch's bodies have been found in the brains of animals, affected with " turning sickness ", up to 24 months after the appearance of symptoms of that disease.

D. mentions surfen C as being the only known drug having a chemotherapeutic effect in a single dose against *Trypanosoma congolense.* He considers that the introduction of tissue vaccines marked a new era in the control of rinderpest in Kenya, particularly in closely settled areas. Indian goat virus (Muktesar virus), attenuated by passage through goats, is not safe to use alone on Kenya cattle, but may be employed with small doses of serum or tissue vaccine. Rinderpest virus does

not appear to be pantropic and D. does not consider that a neurotropic variant can be obtained to serve as a vaccine. Control of Rift Valley fever in lambing ewes by universal inoculation has been successful, at a cost of some loss from abortions and from encephalitis in lambs. It is suggested that at lambing time serum treatment may be a more satisfactory method for dealing with outbreaks.

Nairobi sheep disease, a tick-borne virus disease, is most commonly transmitted by *R. appendiculatus*, but alternative and less common vectors are *Amblyomma variegatum* and possibly *R. bursa*. Ticks infected in any stage by feeding on a reacting animal, carry infection in the next stage, and this includes passage of the virus from the infected female tick through the egg to the larvae of the next generation. When an infective tick becomes detached from the host before the beginning of the reaction it has itself evoked, it will, after moulting, be no longer infective; but if it remains attached until the host reacts to the infection it again becomes infective after the next moult. The virus is pantropic and has been passaged by brain-to-brain inoculation in mice. The disease has been controlled by the use on sheep of oily insecticidal suspensions, but it is suggested that a vaccine prepared from a neurotropic variant strain might be useful.

D. suggests that there are at present no differentiating features between the European and African forms of " snotsiekte " or malignant catarrh. East African swine fever resembles a peracute haemorrhagic form of classical S.F. but no cross-immunity can be demonstrated. The virus is transmissible to wart-hogs and bush pigs, which tolerate infection. Wart-hogs have been found naturally infected. In the discussion D. stated that in this disease, where there is up to 100% mortality, infection appeared to be always due to wild pigs, and not to be spread from farm to farm through domestic pigs. The African virus appears to be a recently acquired infection in the domestic pig.—J. A. Griffiths.

Kelser, R. A. (1938). **Newer Researches Regarding Tropical and Subtropical Diseases.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 774–790. [13 refs.] [In English: French, German and Italian summaries. Discussion pp. 808–809 in English and French].

K. gives a resumé of his investigations and observations in the Panama Canal zone on murrina, Chagas' disease, degenerative arthritis of horses and mules, and equine encephalomyelitis.

Murrina.—*Trypanosoma hippicum* infection of horses and mules in Panama cannot always be diagnosed by microscopic blood examination and a complement-fixation test is, therefore, used. This test has been found of distinct value in eliminating carriers of *T. hippicum*. Antigen is obtained from the blood of white rats infected with *T. hippicum* or *T. equiperdum*; the latter is usually used because of the irregularity of the course of *T. hippicum* infection in white rats. Although the disease is transmissible by the vampire bat, *Desmodus rotundus*, epidemiological evidence indicates that mechanical transmission by blood-sucking flies is a more important factor.

Chagas' Disease.—*T. cruzi* infection occurs in Panama and in other Central American countries. Dogs may act as carriers. A complement-fixation test is employed, using antigen prepared from artificial cultures of *T. cruzi* grown on a modified form of Bonacci medium (1934). The trypanosome form of the parasite occurs only irregularly in the blood, and then only in small numbers.

Equine Degenerative Arthritis.—This occurs among army horses and mules in the Panama Canal zone and is not a manifestation of osteomalacia. It is basically a degenerative condition, involving initially the articular cartilages of the joints. Such bone changes as occur are secondary to the cartilage lesions (which consist

of erosions, fibrillation and grooving). The cause has not been determined, but it is possible that it is due to a vitamin or mineral deficiency, or a combination of these factors, affecting the nutrition of the articular cartilages. The disease appears to be wide-spread and is not limited to the tropics [see *V. B.* **9.** 102]. K.'s observations indicate that the disease is not confined to old animals, and he refers to the striking resemblance of the disease in equines to that seen in man.

EQUINE ENCEPHALOMYELITIS.—The Eastern type occurs in the Panama Canal zone. Transmission experiments with the Panama Eastern virus and the mosquito, *Aëdes taeniorhynchus*, were negative. Parallel transmission experiments with the same species of mosquito and a Western type equine encephalomyelitis virus from the United States revealed, for the first time, that *A.t.* could readily transmit this variety of virus. It is possible for a single mosquito, only biting once, to transmit the infection.—J. A. GRIFFITHS.

MINETT, F. C. (1939). **Diseases of Animals—Prevention & Treatment. Foot-and-Mouth Disease. Tuberculosis. Johne's Disease in Cattle and Sheep. Diseases of Young Calves.**—*J. R. agric. Soc.* **100.** Pt. I. 37–52. 1 table. [Numerous refs.]

This is the annual digest of advances in research on important farm animal diseases, made for the benefit of members of the Royal Agricultural Society. Under F. & M. disease, M. discusses vaccination (Riems method), the influence of the nutritional condition on susceptibility, and the infectivity of affected cattle; under TB., delayed reactions, non-specific reactions and the TB.-like disease of voles are discussed, and under Johne's disease the susceptibility of calves and the disease in sheep. Finally, calf diseases are referred to.—J. E.

GAMBLES, R. M. (1938). **Diseases of Cattle, with Special Reference to Cyprus. [Parts II & III].**—*Cyprus (agric.) J.* **33.** 80–85. [For part I, see *V. B.* **9.** 330].

Very brief notes are given of the cause, symptoms, and treatment and control, of some of the diseases in cattle caused by animal parasites such as piroplasms, coccidia, stomach worms, lungworms, cysticerci, hydatid, warbles, and some external parasites.

Non-infectious diseases such as pneumonia, mastitis, metritis, milk fever, acetonaemia, and disturbances of the digestive tract, are discussed. The article is a popular one and no detailed information is given.—R. ALLCROFT.

SHAHI, H. B. (1937). **A Brief Note on the More Recently Discovered Canine Disorders in India.**—*Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 74–80. 3 tables. Discussion pp. 81–82.

S. discussed various cases investigated at Mukteswar of diseases in dogs since 1929. *Babesia canis* and *B. gibsoni* were found in some cases and tuberculosis in one. COOPER, investigating the different salmonella antigens, obtained negative agglutination reactions with the serum of dogs ill from a variety of diseases; the results were negative for *Salmonella typhi* and *S. typhi-murium* (with one exception) in cases investigated by COOPER and BODMAN. During 1934–36, two organisms were isolated from two different outbreaks of illness at Bhadri kennels :– (1) by DUTTA and MUNRO—labelled "bile smooth (dog 25)" and (2) by S.—a pasteurella type of organism. Details are given of the symptoms, morbid anatomy and serological reactions in infections by these two organisms. A polyvalent vaccine incorporating these organisms was used to protect dogs newly arrived at Bhadri kennels [apparently no tests of the immunity were made].

In the discussion on the paper NAIK doubted whether the two organisms described were the cause of the condition investigated and stated that the alleged pasteurella organism was similar to *Proteus vulgaris*. HASSAN stated that in his experience *B. gibsoni* was the aetiological factor in most obscure fevers of dogs. S., in his reply, said that the disease was met with in almost all the imported breeds of dogs. Adult pariah dogs were resistant, but the disease could be transmitted to young pariah pups. Among newly imported dogs the disease assumed an epizootic character. The possibility that the disease was spirochaetal jaundice was ruled out by the evidence.—J. A. GRIFFITHS.

DAY, F. T. (1939). **Some Observations on the Causes of Infertility in Horse Breeding.**—*Vet. Rec.* **51.** 581–584. 1 table. Discussion pp. 585–587.

D. states that fertility in heavy horses is 59%, in light horses (premium stallions) 52%, in thoroughbreds at stud 68%, and in ponies running wild 95%. These figures are stated to be averages obtained from statistics of a large number of stallions. There are great differences in the records of individual stallions; both mare and stallion play a part, but the mare is more often the cause of infertility.

D. considers first the conditions which influence fertility in the mare. The observations of HAMMOND and of KEDROV are quoted as showing that matings up to 48 hours before ovulation gave 66–71% fertility. This is thought to account for the lower fertility percentage of travelling stallions, as compared with the thoroughbred at stud serving mares on alternate days during oestrus. Causes of sterility in 111 mares with bad breeding records were divided into three groups (1) ovarian dysfunction, 46%; (2) abnormal conditions of other parts of the reproductive tract, 27%, and (3) no apparent abnormality of the organs of reproduction, 27%. The technique is described of the operation for treating mares which aspirate air through the vulva. A table of observations on the breeding records and semen examination of 19 stallions is given. The method is described for collecting sperm by the use of an artificial vagina as used at Cambridge. In the discussion, the importance of the nutritional factor was emphasized, and the higher fertility rate of mares living on open range compared with that of those in close confinement, was stressed.—J. A. GRIFFITHS.

KREMBS, J. (1939). Fallwilduntersuchungen 1935 mit 1938. [**Results of P.M. Examination of Dead Game Animals, 1935-38**].—*Tierärztl. Rdsch.* **45.** 763–766 and 773–776. 11 figs., 2 tables. [Numerous refs.]

Details are given in tables of the P.M. findings in 432 game animals of various species received by the Veterinary Pathological Institute at Munich during the years 1935–1938; the carcasses came from various parts of Bavaria. The species from which most carcasses or organs were received were deer (286). Parasitic infestation was extremely common in these animals (85% of cases); it was considered that the parasites were responsible for death in 30% of the animals, and in a further 55% they were incriminated as a contributing factor. Lungworms, usually *Protostrongylus capreoli* and occasionally *Dictyocaulus viviparus*, were found in 101 animals and probably caused death in 34 of these. Stomach worms (*Haemonchus contortus*) were found in 51 deer and probably accounted for the death of 37. The throat bot-fly (*Cephenomyia stimulator*) was found in 34 deer, being considered responsible for death—usually from pulmonary oedema and asphyxia—in 21. Other conditions in deer included foot and mouth disease (2 positive, 5 suspected), tuberculosis (5), actinomycosis (3) and bacillary necrosis (14). Other conditions found in deer included various traumatic injuries, generalized lymphomatosis and a variety of neoplasms.

Of the hares examined, 60% died from infectious disease, mainly pseudo-tuberculosis and staphylococcal infection. Parasitic infestation in this species included a heavy infestation with *Fasciola hepatica.*

The original should be consulted for details of a variety of pathological conditions in other species.—E. G. WHITE.

CHADDOCK, T. T. (1940). **Diseases of Mink.**—*Amer. Fur Breed.* **12.** No. 10. 6–8 and No. 11. 6–10.

This article is based on an extensive laboratory survey since 1934 of diseases relating to 26,046 mink, at the State Experimental Game and Fur Farm, Polynette, Wisconsin.

C. considers that treatment of coccidiosis is unsatisfactory, but that strict sanitary measures can control the disease; these measures are not detailed. A disease caused by larvae of the screw-worm fly (*Cochliomyia*) is prevalent in spring and early summer. Living tissues, especially of the body openings, between the toes, in the neck region, and at the edges of wounds are invaded by the hatched larvae. Mink kits up to ten weeks old are most commonly affected. An ether-chloroform mixture and 5% cresol are useful dressings. Fly netting around the cages and fly repellents, plus examination of mink every three days during the fly season are among the preventive measures advised. Guinea worm (*Dracunculus medinensis*) is mentioned as a rare parasite of mink. Strict sanitary control of the watering system is essential. Distemper has been controlled on several large ranches (10,000 treatments) by double injections of a tissue vaccine prepared from mink affected with the disease. [No mention is made of secondary infections to distemper in mink. These may account for the very variable mortality rates cited.] Tail chewing (or fur clipping) may be set up by mechanical injury, by matting of fur in dirty nest boxes or by faults in nutrition. *Bacterium coli* has been found as a secondary invader in the lesions. A hereditary factor may predispose to the condition. Food deficiencies and food poisoning account for about half the mortality rate of mink. *Clostridium botulinum* and streptococci are cited as food poisoning organisms. There is reference to vitamin B deficiency as a cause of progressive paralysis.—C. V. WATKINS.

I. GEERTSEMA, G. (1940). Een toxische haemoglobinaemie en haemoglobinurie bij het rund in Drenthe. [**Toxic Haemoglobinuria and Haemoglobinaemia in Cattle in Drenthe, Holland**].—*Tijdschr. Diergeneesk.* **67.** 176–185. 1 graph. [1 ref.]

II. THIJN, J. W. (1940). Bijdrage tot de kennis van de weide-haemoglobinurie van het rund. [**Pasture Haemoglobinuria in Cattle**].—*Ibid.* 421–446. 11 figs., 3 tables. [Numerous refs.] [English, French and German summaries].

I. The condition appears only in Drenthe and the neighbouring parts of Groningen in Friesland which have a similar geological formation. It does not occur in Hanover and Oldenburg although there are stretches there with a soil formation similar to those in Drenthe. Its occurrence is confined to peaty land, and animals on land of a different character even in the immediate vicinity are not affected. The incidence of the disease increases in proportion to the extent of grazing and the rate of growth of the grass. Milch cows are the most susceptible. Symptoms most often appear 5–14 days after the animal has been put to grass and consist of haemoglobinuria, diarrhoea, cachexia and progressive unthriftiness. A few days on healthy pasture effect a cure. Within two days of going to graze on affected land 35% of the r.b.c. may be of a thorn-apple shape. A week later

the number of damaged cells may rise to 90% and haemolysis follows. The administration of mineral mixtures did not cure the disease, and the iron content of the soil seemed to be unconnected with the condition. Inferential evidence is quoted to show that the cause is a vegetable toxin in the grass.

II. The blood picture found in pasture haemoglobinuria is described. Attention is drawn to inclusion bodies found in the red blood corpuscles ; their formation is illustrated diagrammatically and their morphology and their method of extrusion discussed. Their staining, morphological peculiarities and their solubility show that they are of the nature of Heinz-Ehrlich bodies. A review of the literature concerning these bodies is given so as to show their connexion with methaemoglobin formation and various toxins. The methaemoglobin content of the blood of affected cows was studied, and attention was not confined to the plasma but extended to the pigment contained in the inclusion bodies which G. made soluble with dilute acid. It was shown that the pigment was not actually methaemoglobin but a very closely related material. The number of inclusion bodies found in the blood was in direct relation to the quantity and rate of growth of the grass—they were sometimes found in 90% of the r.b.c. of animals kept on quickly growing grass. Haemoglobinuria appeared only when the inclusion bodies were numerous, and the other clinical symptoms followed. The therapeutic treatment of the condition is discussed.—G. WILLIAMSON.

WITZIGMANN, J. (1938). Die Myoglobinurie des Pferdes. [**Myoglobinuria of Horses**].—*Tierärztl. Rdsch.* **44.** 714–718. [Numerous refs.]

W. concludes that myoglobinuria is a disturbance of muscle physiology characterised by hyperglycaemia, hyperadrenalinaemia and deviations from the normal in the phosphorus and creatinin metabolism. There is hyaline degeneration of the muscles, exudation of myoglobin, formation of lactic acid, and necrosis. It has generally been considered that absorption of excessive quantities of proteins and glycogen through improper feeding is the main cause of the condition. Only in exceptional cases may cold act as a " trigger factor ". Some authors have claimed good results from the use of insulin, cattle blood, and certain proprietary remedies which are mentioned. W. recommends early and plentiful blood-letting, together with intravenous infusion of alkaline solutions, and the symptomatic treatment of complications originating in the heart, the digestive organs and the urinary system ; no evidence, however, is given to support the adoption of such treatment.—V. CHLÁDEK.

FLORIO. (1939). La myoglobinurie du cheval : conceptions étio-pathogéniques et sanctions thérapeutiques. [**Myoglobinuria of the Horse : Aetiology, Pathogenicity and Therapeutics**].—*Rev. vét. milit.* **23.** 117–147. [Numerous refs.]

A review article dealing with the various theories which have been advanced by continental workers in explanation of the causation of equine myoglobinuria. F. classifies theories on the physiopathology of the disease into two groups :– (1) a breakdown in sugar metabolism, with failure of glycolysis manifested by increases in sugar and lactic acid of the blood and in glycogenolysis of the muscle ; and (2) the probability of a breakdown in the metabolism of the phosphorous components in the muscles, manifested by the excessive elimination of creatine, by hyperguanidaemia and by hyperphosphataemia. F. also reviews the various forms of treatment which have been proposed. No original data are given, but a good bibliography is included in the article.—N. J. SCORGIE.

SPALINA. (1940). Betrachtungen über Aetiologie und Therapie der enzootischen Hämoglobinurie des Pferdes. [**Aetiology and Therapy of Equine Enzootic Haemoglobinuria**].—*Z. Veterinärk.* **52.** 40–41.

S. describes his experience of 300 cases of enzootic haemoglobinuria. It occurs during autumn and winter and appears to be due to some dietary deficiency which can be made good by the feeding of greenstuff. Mortality is 40–90%. The condition is said to resemble paralytic haemoglobinuria [presumably myoglobinuria (see *V. B.* **1.** 234)].

For treatment, S. recommends methylene blue given intravenously or perorally. —J. E.

BREITENSTEIN. (1940). Die Schweinsberger Krankheit. [**Schweinsberg Disease in Horses**].—*Z. Veterinärk.* **52.** 41–42.

This is a chronic liver disease combined with peculiar brain disorders like *Dummkoller*. It is enzootic in parts of Germany. B. describes one case in an army horse which showed depraved, and later lack of, appetite and signs of grave brain disorder whereby the animal blundered into objects and had periods of sleepiness. It was judged incurable and killed. The only P.M. abnormalities were great shrinkage of the liver, fullness of the stomach with coarse fodder, and emptiness of the intestine. [Further details are lacking.]—J. E.

CRAIG, J. F., & RATTER, A. (1940). **Contagious Keratitis in Cattle.**—*Vet. Rec.* **52.** 433–434. [9 refs.]

This outbreak started in a Friesian cow imported from Canada, and seven other cattle became infected. The symptoms were lachrymation, photophobia, congestion and oedema of the conjunctiva and swelling of the eyelids followed by opacity of the cornea and a yellow, purulent discharge. The cattle were at first confined in a darkened shed and cod-liver oil was dropped into the conjunctival sac. The disease gradually cleared up. Although artificial transmission failed it is suggested that biting flies may have damaged the cornea and so allowed an inoculum to become established.—R. FISHER.

BUENÒ, P. (1938). Sobre a histopatologia da broncopneumonia contagiosa dos suinos. [**Histopathology of Contagious Broncho-Pneumonia of Swine**].—*Arq. Inst. biol., S. Paulo.* **9.** 303–312. 15 figs. on 8 plates. [Numerous refs.] [English summary].

B. describes in great detail the anatomical and histological lesions caused by a contagious broncho-pneumonia of swine. The lesions described differ in no essential from those observed in swine influenza and B. is carrying out experiments to ascertain whether the same virus is concerned.

He also points out that the lesions are very similar to the pulmonary lesions sometimes found in association with paratyphoid and suggests that the pulmonary lesions found in " pneumo-paratyphus " of swine are not caused by *Salmonella* but by a virus, the *Salmonella* being a secondary invader.—MILLER WATSON.

MCLENNAN, G. C., MACINDOE, R. H. F., & MCKENNA, C. T. (1938). **A Condition of Unknown Aetiology Affecting Pigs.**—*Aust. vet. J.* **14.** 245–246. [3 refs.]

A disease characterized principally by diarrhoea affected about 33 out of 400 pigs in a piggery in which hygienic and dietetic conditions were good. For from 2–4 days before death affected animals showed slight fever and passed diarrhoeic faeces containing blood clots and mucus. At autopsy, there were haemorrhages and inflammation in the large bowel. Bacteriological investigation failed to reveal

any causal agent, and swine fever was eliminated as a possibility. The condition may have been identical with one described in the U.S.A., the cause of which also remained obscure [see *V. B.* **6.** 879].—W. I. B. Beveridge.

White, P., & Caughley, F. G. (1938). **Effect of the So-Called " Facial Eczema " on Sheep-Skins.**—*N.Z. J. Sci. Tech.* **20.** 92A–97A. 8 figs. [4 refs.]

Disorders of the skin of sheep known as " cockle ", " rape scald " and " facial eczema " are described. These conditions occur at certain periods of the year when the wool is long and when the sheep graze on immature rape or young grass, at which stage the protein content of these green feeds is very high. It is thought that these three disorders of the skin are due to a nutritional factor, probably a high protein diet. Photomicrographs of sections of the epidermis and a description of the lesions which occur in skins affected with facial eczema are given. The corium is not shown because this appears to be entirely unaffected.—R. Allcroft.

Flight, C. H. (1940). **A Case of Congenital Porphyrinuria (" Pink Tooth ") in a Grade Friesland Cow.**—*J. S. Afr. vet. med. Ass.* **11.** 16–19. 1 fig. [3 refs.]

The case of congenital porphyrinuria described in this article showed discoloured teeth, porphyrin in the urine and extensive skin lesions of photosensitization. The disease had very little adverse effect on the animal and during the period of observation two normal calves were produced. The skin lesions were confined to the unpigmented portions of the integument. The older lesions were hard keratinized crusts, but younger lesions consisted of dry soft scabs and crusts or raised reddish wheals. F. was able to trace a relationship between this cow and two other cases previously described by him, suggesting hereditary transmission through some common ancestor.—E. M. Robinson.

Brand, E., Cahill, G. F., & Kassell, Beatrice. (1940). **Canine Cystinuria. V. Family History of Two Cystinuric Irish Terriers and Cystine Determinations in Dog Urine.**—*J. biol. Chem.* **133.** 431–436. 3 tables, 1 chart. [10 refs.]

Reports of further investigations on the occurrence of cystinuria in a family of Irish terriers are given. The sulphur partition of the urine of two normal female members and one cystinuric male of this family showed that the cystine sulphur of the latter accounted for 13% of the total S and 40% of the neutral S. In carrying out the determinations it was found that the urines of cystinuric dogs frequently contain substances which interfere with the Fabin, Sullivan and intraprusside reactions for cystine. The procedure adopted to overcome these difficulties is described.—R. Allcroft.

Ten Broeck, C., & Nelson, J. B. (1938). **A Highly Fatal Disease of Guinea Pigs.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 572–573.

An agent is described which appears to be a filtrable virus capable of producing disease by itself as well as in association with the common g. pig pathogens. The disease occurred spontaneously in a group of apparently normal g. pigs. Inoculations of organ suspensions from affected animals proved fatal in about two weeks after subcutaneous, intraperitoneal, intracerebral or intranasal injection. The infection could be transmitted by contact, but attempts to infect by feeding were unsuccessful. Symptoms and lesions are described.—R. Allcroft.

FONTAINE, P. (1938). Étude par les statistiques des conditions de fréquence du cancer spontané chez les animaux domestiques. [**Incidence of Cancer in Domestic Animals**].—*Thesis, Toulouse.* pp. 160. [Numerous refs.]

This is a comprehensive, although uncritical, review of the literature dealing with tumours in domestic animals. After a brief historical introduction, the thesis deals with the subject in three parts :– the first discusses benign and malignant tumours and their relative incidence, the second deals with the part played by species, age, sex, breed, and skin colour, and the third part considers tumours in the various organs and tissues.

Throughout the thesis both benign and malignant tumours are dealt with, although the title would suggest that the latter alone come within its scope.

The description and classification of growths given by many of the older workers would not be acceptable in many cases to-day, and the inclusion of their figures as to incidence may be misleading. For this reason, many of the figures given in the paper as to the incidence of particular tumours may be questioned. Especially is this so in the case of neoplasms, the exact classification of which has only recently been worked out, *e.g.* testicular tumours, neoplasms of the nervous system, melanotic tumours. No attempt has been made by F. to discuss critically the records of others, but a useful service has been rendered in bringing together a mass of literature on the subject, which can be consulted by those interested. It is impossible in a short abstract to deal with any points in detail.—E. G. WHITE.

SWETT, W. W., MATTHEWS, C. A., & GRAVES, R. R. (1940). **Extreme Rarity of Cancer in the Cow's Udder : A Negative Finding of Vital Interest to the Dairy Industry and to the Consumer.**—*J. Dairy Sci.* **23.** 437–446. 4 figs., 1 table. [5 refs.]

The authors studied 418 udders from cows of all ages. The udders were filled with formalin, frozen and cut into sections. Mastitis and abscess formation and the resulting complications were the usual lesions found. The age incidence and occurrence of human mammary cancer is discussed, and the entire absence of any lesion suggestive of cancerous growths in the udder of cows is emphasized.
—R. FISHER.

D'ATH, E. F. (1939). **The Serological Diagnosis of Cancer. A Review of the Present Position.**—*N.Z. med. J.* **38.** 334–340. [19 refs.]

As indicated by the title, this is essentially a review article and no new facts are presented.

The author discusses the data regarding the various serological tests, some of which have been used with a fairly high degree of accuracy. He concludes that it is not yet advisable for serological tests to become part of the routine diagnostic technique, because of the complexity and expense of the more reliable tests, the personal factor involved in their execution, and the fact that none of the tests has yet proved sufficiently reliable.—LEWIS FITCH.

DOBBERSTEIN, J., & SEIFRIED, O. (1939). Leukosen der Haustiere. [**Leucosis in Domestic Animals**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 571–587. [Numerous refs.] [In German : English, French and Italian summaries. Discussion p. 588 in German].

Leucosis occurs in its various forms in all species of domestic animals and is usually of the aleucaemic type. Cattle leucosis is the most important form, and its incidence in Germany among slaughtered cattle has risen during the years 1927–1936 by approximately 100%. The disease usually occurs in cattle of

5–8 years of age, but calves may also be affected. The aetiology is not known, but a variety of theories has been proposed including the action of a filtrable virus, protein intoxication and hormone disturbances. The blood picture is very varied, the commonest finding being the presence of large numbers of primitive " lymphoid " cells. There are a number of records of transmission of the disease to the foetus *in utero.*

The gross lesions are of two main kinds, nodular and diffuse. The lymph nodes are always involved and other tissues usually affected include the liver, the mucous membrane of the gastro-intestinal and urino-genital tracts, the myocardium, and subserous connective tissue. The disease is fundamentally a proliferation of undifferentiated mesenchyme cells in various situations. There are points of resemblance between bovine leucosis and the disease in fowls.

In the discussion on the paper, FORTNER (BERLIN) dealt with spontaneous leucosis in mice and the striking effect of heredity on the incidence of the disease as shown by American workers. He suggested that heredity may play an important part in bovine leucosis and advised that cattle from parents affected with the disease should be excluded from the breeding stock.—E. G. WHITE.

EILMANN. (1940). Myeloische Chloroleukose (Chloromyelose) bei einem Schwein. **[Myeloid Chloroleucaemia in a Pig].**—*Dtsch. tierärztl. Wschr.* **48.** 74–76. [Numerous refs.]

Chloroma has been described in pigs and fowls and a single case has been recorded in a calf. It is a very rare condition in man, where it takes the form of a malignant tumour, involving the red marrow of bones and various internal organs and lymph nodes. The lesions are greenish in colour, and the nature of the pigment is not known.

E. describes a case in a sow with lesions in the bones, liver, spleen, myocardium, various lymph nodes, gastric mucosa, and spinal dura mater. It was not possible to examine the blood picture, as the animal had been slaughtered before the condition was recognized. The cells concerned in the infiltration were of the myeloid series, the condition being a special type of myeloid leucosis characterized by the peculiar greenish coloration of the lesions. Unsuccessful attempts were made to identify the pigment by chemical methods.—E. G. WHITE.

I. MACDOWELL, E. C., POTTER, J. S., RICHTER, M. N., VICTOR, J., BOVARNICK, M., TAYLOR, M. J., WARD, E. N., LAANES, T., & WINTERSTEINER, M. P. (1938). **Experimental Leukemia.**—*Yearb. Carneg. Instn.* No. 37. Division of Animal Biology. pp. 47–52. Washington, D.C. : Carnegie Institution of Washington.

II. MACDOWELL, E. C. (1938). **What and Why is Leukemia?—A Medico-Biological Study on Mice.**—*Publ. Carneg. Instn.* No. 501. pp. 353–367. [9 refs.] Washington, D.C. : Carnegie Institution of Washington.

I. Actively induced resistance to the injection of leucaemic cells has been passively transferred to susceptible mice. Passive immunity was conveyed by the injection of a saline suspension of minced tissue from actively immunized mice ; the injection of serum from the latter gave no immunity. Immediate protection was conferred and was effective even when a lethal dose of leucaemic cells was injected as long as three hours before giving the immunizing material. That the immunity conferred is a passive one, in spite of the fact that a cell-free extract was not used, is shown by the immediate protection obtained. Genetically identical living cells from non-immunized mice gave no immunity, showing that the protection is not due to the living cells as such.

A hypothesis has been developed according to which malignancy modifies the rate of normal cellular differentiation and its direction. The direction of development of malignant cells, according to this hypothesis, may change when they are injected into an incompletely resistant host. Thus, a malignant factor which has for many years constantly developed a lymphoid character may change to myeloid and may then revert to its original lymphoid type when returned to its normal host. This hypothesis brings myeloid and lymphoid leucaemia closer together and supports the theory of a common ancestral cell able to differentiate in the normal animal in either direction according to its requirements of the individual.

Cinematographic studies of malignant lymphocytes in tissue culture are recorded, which show that these cells have the same morphological characteristics as normal lymphocytes at the same stage of differentiation.

II. This study was carried out on a colony of genetically uniform strains of mice produced by brother-sister mating, some strains being in the 48th generation of this inbreeding. In one of these strains the incidence of spontaneous leucaemia —mainly of the lymphatic type—was 90%. Leucaemia is a neoplastic growth, beginning as a focal proliferation of reticulum cells in various situations. These cells are of independent origin and give rise in leucaemia to immature, but slowly and continuously differentiating cells which may invade any or all parts of the body, thus obliterating all trace of the point of origin. The earliest stages were studied in a large series of mice by examining biopsy material removed at regular intervals. Once established, the leucaemic cells are able to grow indefinitely, and can be transplanted successfully into mice of the same genetic constitution. The condition can be maintained indefinitely by a series of such transplantations. No bacteria have been found necessary for the proliferation of the leucaemic tissue, and cell extracts prepared by a variety of methods fail to produce leucaemia. The cells have been transferred through as many as 800 mice in succession, starting with a spontaneous case.

It was found that transplanted leucaemic cells differ immunologically from spontaneous leucaemic cells, and the repeated injection of the former fails to protect animals against spontaneous leucaemia. In future work on immunization against spontaneous leucaemia, it is important to use malignant cells direct from spontaneous cases since a series of transplantations alters their antigenic properties.

Both heredity and environmental influences exert an effect on the development of spontaneous leucaemia. In hybrid animals, in comparison with genetically pure strains, dependence on extrinsic factors is greatly increased.

The results summarized in this paper represent the contributions of a number of workers at the Carnegie Institution.—E. G. White.

Victor, J., & Potter, J. S. (1938). **Influence of Transmitted Leukaemia on Metabolism of Uninfiltrated Lymphoid Tissue.**—*Brit. J. exp. Path.* **19.** 227–238. 6 tables. [13 refs.]

The effects of intraperitoneal inoculation into mice of leucaemic spleen or lymph nodes of two different transmission lines (A and I) are reported. Lymph node biopsies before, and at daily intervals after inoculation, allowed the metabolism of the lymphoid tissue in the same animal to be studied. The interval between death and inoculation with line I was 3–4½ days, and with line A, 6–8 days. All biopsies were performed on peripheral lymph nodes with the exception of those carried out on the day the animal was sacrificed. The respiration of the tissue was observed in Ringer-phosphate solution, pH 7·4. Aerobic glycolysis was measured by Warburg's method; anaerobic glycolysis was measured by the same method except that the gas mixture was 95% N_2 and 5% CO_2 instead of 95% O_2 and 5% CO_2.

The data show that a marked depression of the anaerobic glycolytic rate, but not of the aerobic or respiratory rates, occurred in uninfiltrated lymphoid tissue after intraperitoneal injection of leucaemia cells. This response is specific not only for leucaemic tissue, but also for the individual transmission line; with transmission line I the depression is apparent one day after injection while line A requires two days for the same effect. The effect is not observed with splenic and lymphoid tissue injection of normal mice of the same or foreign strains. The observations indicate that the inhibition of anaerobic glycolysis of uninfiltrated lymphoid tissues of leucaemia hosts is not due to the direct action of leucaemia cells. The mechanism of this inhibited glycolytic activity is not clear, but the degree of inhibition is influenced by time and/or by the quantity of leucaemic tissue in the host, since the amount of leucaemic tissue increases with the interval after inoculation. The inhibition occurs in tissue free from leucaemia cells as well as in tissue containing leucaemia cells, and therefore it is thought that a humoral factor, which is either a product of leucaemia cells or the result of a reaction between host and leucaemia cells, also influences the degree of inhibition. —R. ALLCROFT.

JÁRMAI, K. (1939). Leukose und Sarkom beim Wellensittich. [**Leucosis and Sarcoma in Budgerigars**]. *Arch. wiss. prakt. Tierheilk.* **74.** 316–323. 5 figs. [8 refs.]

Leucosis has been recorded in a large number of species of birds other than the domestic fowl. There are numerous records of the disease in canaries and one recorded case in a budgerigar. J. describes a further case in the latter species and reviews the literature.

A female budgerigar developed rapidly growing nodules beneath the wings, and died during an attempt to remove the masses by operation. The tumours were spindle-cell sarcomata. The liver was not enlarged, but showed on histological examination an early stage of erythroleucosis. Unsuccessful attempts were made to transmit the neoplasm and the leucosis to other budgerigars, and to canaries, fowls, pigeons, and mice. The male budgerigar of the pair had been in contact with the female for two years and did not develop the disease. It is suggested that both the sarcoma and the erythroleucosis were of the non-transmissible type, examples of which are known to occur in fowls. It is not possible to suggest what relationship, if any, existed between the two conditions. E. G. WHITE.

EMMEL, M. W. (1939). **Hemocytoblastosis in the Chicken.** —*Proc. 7th World's Poult. Congr., 1939.* pp. 298–300. Washington, D.C.: U.S. Dep. Agric. [In English].

The blood-forming tissues are more easily stimulated in the fowl than in other animals. E. divides the various causes of haemocytoblastosis into five general groups: (1) bacterial, (2) nutritional, (3) atmospheric, (4) genetic, and (5) experimental. The nature of each of these groups is explained.

E. believes that fowl paralysis, leucaemia and associated diseases may be due directly to infection with the organisms of the salmonella group [see also *V. B.* **8.** 793]. Further, the intensive system of management of birds which is conducive to adverse atmospheric conditions may be associated with the causes of the fowl paralysis complex. The pathology of haemocytoblastosis in relation to fowl paralysis and allied conditions is discussed.

[E.'s belief that fowl paralysis may be caused by bacteria is contrary to the fundamental work of ELLERMAN and BANG and their concept of leucosis as due to a filtrable agent, and to more recent observations in the United Kingdom by BLAKEMORE and DALLING, (see *V. B.* **10.** 782). The provision of more experimental data seems necessary before such a view can be accepted.]—S. G. IYER.

KABAT, E. A. (1939). **A Polysaccharide in Tumors due to a Virus of Leucosis and Sarcoma of Fowls.** —*J. biol. Chem.* **130.** 143–147. 2 tables. [10 refs.] [Author's summary copied *verbatim*].

A polysaccharide has been found in tumors produced by a virus causing fowl sarcoma and leucosis. It is very similar in its chemical properties and in its behavior toward a pneumococcus enzyme preparation to that isolated from vitreous humor, umbilical cord, synovial fluid, and the mucoid hemolytic streptococcus.

HAMILTON, C. M., & SAWYER, C. E. (1939). **Transmission of Erythroleukosis in Young Chickens.** —*Poult. Sci.* **18.** 388–393. 3 tables. [4 refs.] [Authors' summary copied *verbatim*].

1. A virulent strain of erythroleukosis was produced from chickens in which a natural outbreak of the disease was first diagnosed when the chickens were 39 days of age.

2. This strain was characterized by the presence in blood-films of erythroblasts and distorted erythrocytes and in a few films of immature myeloblastic cells.

3. This strain of erythroleukosis was transmitted through 12 successive groups of young chickens by intravenous inoculation. The minimum interval between inoculation and death was 5 days, the maximum 27, and the average 14·7.

4. The interval between inoculation and death was not consistently reduced as the passage progressed through the successive groups.

5. All chickens inoculated intravenously or intraperitoneally succumbed to the disease. Twenty per cent of those inoculated within the bursa of Fabricius died of erythroleukosis. The application of the inoculum to the scarified mucous membrane of the cloaca failed to produce the disease.

6. Changes which were typical for erythroleukosis were identical in blood-films from both spontaneously infected chickens and experimentally infected chickens.

TOCANTINS, L. M., & STEWART, H. L. (1939). **Pathological Anatomy of Experimental Thrombopenic Purpura in the Dog.** *Amer. J. Path.* **15.** 1–23. [Numerous refs.]

T. showed in 1936 that the injection of anti-platelet serum into dogs is followed by an acute attack of purpura lasting approximately 48 hours and ending in spontaneous recovery. The present paper deals with the pathological anatomy of the disease produced experimentally in 25 dogs. The anti-platelet serum is produced by injecting rabbits intravenously with a series of doses of washed platelets from the blood of normal dogs.

The clinical picture is divided, for convenience, into three stages: (1) an acute stage lasting for about five days, characterized by thrombopenia, prolonged bleeding time, tissue haemorrhage and oedema; (2) an intermediate stage lasting from the 5th to the 10th day with a rising platelet count, short bleeding time and vascular thrombi in various organs, especially in the spleen, and (3) a reactive stage with a high platelet count and hyperplastic changes in the bone-marrow, spleen, lymph nodes, thymus and Peyer's patches. These stages are in some respects similar to those occurring in thrombopenic purpura in man.

Striking evidence of the relationship of the megakaryocytes of the bone-marrow to the blood platelets was obtained. Intraperitoneal injection of anti-platelet serum in 2-day-old puppies was followed by the almost complete disappearance of the usually numerous megakaryocytes from the liver, spleen and bone-marrow.—E. G. WHITE.

HOBSON, Felicity C. G., & WITTS, L. J. (1940). **Platelet-Reducing Extracts of the Spleen.**—*Brit. med. J.* Jan. 13th. 50–51. 1 table. [4 refs.]

An acetone extract of a spleen removed from a woman suffering from thrombocytopenic purpura reduced the platelets of a rabbit more powerfully than an acetone extract of a normal spleen. A Ringer extract of normal spleen was more effective in reducing platelets than the acetone extract of normal spleen. An investigation of the optimum conditions for extracting platelet-lowering substance from spleen appears desirable, before the conditions in health and disease are compared.—J. M. ROBSON.

NUTRITION IN RELATION TO DISEASE

WATERS, D. F. (1938). **An Iodine Survey of New Zealand Live Stock. Part IV. Sheep of the Marlborough, Nelson and Westland Districts and Review of the South Island.** *Trans. roy. Soc. N.Z.* **67.** 463–474. 3 tables, 3 figs. [3 refs.] [For previous parts, see *V. B.* **4.** 490 and 680; **7.** 143.]

This completes the account of the iodine survey of animal thyroids made in New Zealand. Thyroid glands were taken from slaughtered lambs, and data were collected separately from the owners. But, owing to the wide variations occurring in glands from the same farm and taken in the same season, no attempt was made to correlate the iodine content of the thyroid with the data collected.

Each district is dealt with separately and results are detailed in tables and graphs. It was found that the soils of the districts of Otago, Marlborough, Nelson, and Banks Peninsula have a high iodine content and that Westland, Southland, and Buller Valley are deficient areas, in which outbreaks of goitre are to be expected.

CARDASSIS, J. (1938). Contribution à l'étude de l'ostéomalacie chez les bovidés. [**Osteomalacia in Cattle**].—*Thesis, Alfort.* pp. 151. 2 tables. [Num. refs.]

A general review of the existing state of knowledge of osteomalacia in cattle without the addition of any new fundamental material. The disease originates as a nutritional deficiency of Ca, P, or both (most frequently that of P), often associated with deficiencies of these minerals in the soil. Meteorological conditions also play a part in the development of the disease, whilst gestation and lactation are amongst the predisposing causes. Osteomalacia, of which the early general symptoms are mentioned, is a demineralization of the bones, following upon demands for Ca and P which the food fails to supply. The blood is at first maintained at a normal level as a result of bone resorption, but first hypophosphataemia, and, in the final stages, hypocalcaemia occur. Prophylaxis depends upon (a) the establishment of adequate Ca and P, supplying sufficient quantities of each element for normal metabolism, lactation and gestation, (b) an adequate Ca : P ratio, (c) an equilibrium of Ca and P with various other constituents of the diet, and (d) improvement of the natural grazing with various Ca and P fertilizers, accompanied by improved drainage and irrigation measures. Some other therapeutic measures are described and discussed.—ALFRED EDEN.

KOVÁCS, G. (1939). Ostitis (osteodystrophia) fibrosa kutyában. [**Ostitis (Osteodystrophia) Fibrosa in Dogs**].—*Állatorv. Közl.* **36.** 115–118. 4 figs. [11 refs.]

A detailed account is given of the macroscopic aspect, X-ray picture and histological structure of the bones in a case of osteodystrophia fibrosa observed by K. in an eight-year-old dog.—E. MARTIN.

Bird, H. R., Oleson, J. J., Elvehjem, C. A., Hart, E. B., & Halpin, J. G. (1939). **Necessity for an Organic Dietary Factor and for Insoluble Grit in the Development of the Gizzard Lining in Chicks.**—*Proc. 7th World's Poult. Congr., 1939.* pp. 174–177. 3 tables. [10 refs.] Washington, D.C.: U.S. Dep. Agric. [In English].

Chickens fed purified rations developed eroded or ulcerated gizzard linings. This disorder is believed to be due to a deficiency of the anti-gizzard erosion factor. Chemical studies of the factor showed that contrary to the report of Almquist and Stokstad [*V. B.* **9.** 108.] it is insoluble in fat solvents, and that it is associated with the connective tissue proteins. It was found that chrondroitin prevented gizzard erosion when fed at a 3% level. Although more or less purified rations have been used in the study of this disorder, it frequently occurs in chicks fed practical rations, especially if the rations contain large quantities of corn. Good sources of the anti-gizzard erosion factor are cartilage, pig's lung, liver and kidney; intermediate sources are oats, wheat bran, wheat middlings, whole wheat and barley. Poor sources are corn, alfalfa, wheat seedlings, peanuts, wheat-germ oil and soy bean oil.

For the prevention of ulcerated gizzard lining the inclusion in the ration is recommended of 30% oats or wheat bran, 15% pig's liver, lung or kidney, 10% cartilage or 3% chrondroitin [see also *V. B.* **9.** 39 and 648].

Another abnormality of the gizzard lining in the form of thickening and softening was observed during the course of these experiments. The condition could be prevented in five-week-old chicks by the inclusion in the diet of 5% granite grit.—R. Allcroft.

Cashell, G. T. W., & Kon, S. K. (1939). **Studies in Lactose and Galactose Cataracts in Rats.**—*Trans. ophthal. Soc. U.K.* **59.** Pt. 1. 199–218. 10 figs., 4 tables. [12 refs.]

It is known that the feeding to rats of diets containing a high percentage of lactose or galactose leads to the development of cataractous changes in the lens. Whole milk contains, on a dry basis, about 40% and separated milk about 50% of lactose, and the purpose of this investigation was to compare the toxicity of lactose as present in milk with that of the isolated substance when incorporated in synthetic diets. It was found that low protein (12% and 13%) synthetic diets containing 50% and 68% lactose produced marked lenticular changes. A high protein (36%) synthetic diet and diets containing dried separated milk (39% protein) produced relatively little change in the lens. Contrary to the experience of some other workers the feeding of fresh or of reconstituted liquid separated milks produced marked toxic changes in the lens in 7–12 months. It appears, therefore, that high protein in the diet exerts a protective action, and that an increase in the liquid intake, *e.g.* in the fresh and reconstituted liquid separated milk, increases the toxicity of the lactose. The various types of changes in the lens on different diets are described. In the case of liquid separated milk, a hitherto unreported feature was the production of a dense opacity under the anterior pole of the lens capsule.

In the discussion on this paper it was pointed out that cataracts could only be produced when the fat was removed from the milk; it was also stated that dried milk intended for feeding babies contained the requisite amount of fat.
—N. J. Scorgie.

I. Nitzescu, I. I., & Ioanid, V. (1940). La glycémie chez les poules en avitaminose B_1. [**Glycaemia in Fowls with Vitamin B_1 Deficiency**].—*C. R. Soc. Biol. Paris.* **133.** 490–491. 1 fig. [1 ref.]

II. NITZESCU, I. I., & IOANID, V. (1940). Vitamine B_1 (aneurine) et glycémie. [**Vitamin B_1 and Glycaemia**].—*Ibid.* 492–495. 3 figs. [1 ref.]

I. Fowls were fed a vitamin B_1 deficient diet on which they reached the stage of acute convulsions after 20–30 days. Blood sugar studies made during this period showed a slight lowering of the initial level after about 10–14 days. The level then rose again, slowly at first and then more rapidly, reaching a peak of about double the initial value, at the time of the convulsive crisis. Injection of crystalline vitamin B_1 at this stage brought the sugar value back to the initial figure.

II. Parenteral administration of crystalline vitamin B_1 at levels of 500 and 1,000 I.U. caused a lowering of the blood sugar of normal fowls by about 25% of the initial level followed by a slow rise to normal within 24 hours. If vitamin B_1 is injected during the acute polyneuritic stage following a period of feeding on a vitamin B_1 deficient diet, the hyperglycaemia is rapidly reduced to normal within 6–24 hours. A glucose-tolerance curve in the normal fowl showed a maximum blood sugar value after half-an-hour, followed by a slow fall. If the administration of glucose is preceded by an injection of vitamin B_1 two and a half hours previously the maximum level reached is lower and the fall to normal much more rapid. This hypoglycaemic action of vitamin B_1 may be due to increased activation of the process of carbohydrate disintegration in the tissues, or perhaps to some relation between vitamin B_1 and insulin activity.—ALFRED EDEN.

I. CHICK, Harriette, MACRAE, T. F., & WORDEN, A. N. (1940). **Relation of Skin Lesions in the Rat to Deficiency in the Diet of Different B_2-Vitamins.** —*Biochem. J.* **34.** 580–594. 3 text figs., 2 tables. [Numerous refs.]

II. CHICK, Harriette, EL SADR, M. M., & WORDEN, A. N. (1940). **Occurrence of Fits of an Epileptiform Nature in Rats Maintained for Long Periods on a Diet Deprived of Vitamin B_6.**—*Ibid.* 595–600. 3 figs. on 1 plate. [15 refs.]

I. The occurrence of two different types of skin lesions in rats deprived of the heat-stable B vitamins was confirmed [see *V. B.* **6.** 901.], and subsequently three groups of animals were maintained from weaning on a vitamin B free basal diet + vitamin B_1, with supplements of either riboflavin and filtrate factor, or riboflavin and vitamin B_6, or filtrate factor and B_6 respectively. Rats deprived of riboflavin failed to gain in weight, developed an eczematous condition of skin, and exhibited lesions of the cornea and conjunctiva; rapid recoveries ensued when riboflavin was given. Rats deprived of vitamin B_6 developed a characteristic dermatitis which responded promptly to doses of the pure vitamin. Filtrate factor deficiency resulted in subnormal growth and poor coats, the fur of which often became grey; a reddish exudate present on the coat was found to contain protoporphyrin. The relation of the skin symptoms to the known missing factor was not always specific, however, and it is concluded that the members of the vitamin B_2 complex have a normal mutual interaction in the animal body.

II. The animals in the vitamin B_6 deficient group referred to in I, without exception, developed fits when maintained for about four months on a basal diet containing sucrose or raw starch as a source of carbohydrate, but fits did not occur in rats which were kept on a basal diet containing cooked starch. (This fact, together with the better protective action against dermatitis conferred by the cooked starch diet, indicates that there are traces of vitamin B_6 in cereal starches and that cooking renders them more readily available.) The fits were epileptiform in nature, and could be both prevented and cured by the administration of 10–15μg. daily of crystalline vitamin B_6. The addition of nicotinic acid to the diet did not appear to exert any influence on body weight, skin lesions or fits.

THERAPEUTICS

GERSTNER, R. (1938). Beitrag zur Infusionstherapie des gelben Galtes. [**Infusion Therapy of Mastitis**].—*Arch. wiss. prakt. Tierheilk.* **73.** 362–373. [5 refs.]

G.'s concise and practical contribution deals with the treatment of 76 quarters of 25 cows in one herd, of which 23 cows were cured, 70 quarters still functioning properly. A comparison was made of the relative value of entozon (1 : 1,250 in lactating cows and 1 : 1,000 in dry cows) and trypaflavine (1 : 10,000–1 : 20,000 in both lactating and dry cows); in many cases the two agents were compared on different quarters of the same cow.

Thirty-nine infected quarters were treated during the dry period. Of 12 quarters which were treated with entozon (10 twice and 2 once) all were cured. Of 25 quarters which were treated with trypaflavine (6 twice and 19 once) all but 2 were cured. Two further quarters which were treated with trypaflavine in 25 % glucose solution were, however, not cured.

Thirty-seven quarters were treated during lactation. Of 10 quarters treated twice with entozon 5 were cured. Of 23 quarters treated once only with trypaflavine 15 were cured, of 10 treated twice 6 were cured, of 8 treated three or four times 5 were cured, and of 3 treated five times 1 was cured. Two quarters could not be cured.

The method of infusion was similar to that outlined under the abstract of SEELEMANN and SIEMOSEN's article [*V. B.* **10.** 207.], distilled water being always used as the diluent and the udder being filled to the tension normally found at milking time. When larger amounts were infused considerable swelling and some constitutional reaction often occurred.

Quarters treated during the dry period milked well upon subsequent lactation, often better than the healthy quarters of the same cow. Those treated during lactation with entozon (two infusions) gave 20–100 % (average 67 %) of the previous yield. Those treated once with trypaflavine gave 62–129 % (average 94 %), those treated twice 77–103 % (average 86 %), those treated 3–4 times an average of 57 %.

It is concluded that in lactating animals trypaflavine is not only more effective [presumably on account of the higher number of cures by one infusion] but also definitely less irritant as shown by its effect on milk yields and otherwise.—A. W. S.

HABS, H., & BADER, R. (1938). Chemotherapeutische Versuche mit "Prontosil" bei der experimentellen Streptokokkeninfektion der Meerschweinchen. [**Use of Prontosil for the Chemotherapy of Experimental Streptococcal Infections of G. Pigs**].—*Z. ImmunForsch.* **94.** 66–78. [5 refs.]

A haemolytic streptococcus strain highly pathogenic for mice was used for the experiment. The strain was very sensitive to prontosil. Intraperitoneal and intracardial infection of g. pigs did not produce any acute septic affection. Subcutaneous infection caused acute cellulitis, death ensuing in some cases whereas in others the condition ran a chronic course (caseous abscesses). In some acute cases prontosil was considered to have saved the life of the animal and in others to have lengthened it. In the chronic cases the remedy was quite ineffective. The dose per day varied from 0·5 c.c. prontosil soluble in a concentration of 2·5 %, to 1 c.c. "prontosil *forte*" in a concentration of 5 %. The administration was intraperitoneal. Early treatment is indicated.—V. CHLÁDEK.

PORTER, J. R., & HALE, W. M. (1939). **Effect of Sulfanilamide and Sulfapyridine on Experimental Infections with Listerella and Erysipelothrix in Mice.**——*Proc. Soc. exp. Biol., N.Y.* **42.** 47–50. 2 tables. [4 refs.]

The results of experiments on 380 mice showed that sulphanilamide and

sulphapyridine were of use in treating mice infected with fatal doses of *L. monocytogenes* but had no helpful effects in the case of *Erysipelothrix*.—F. T. Boyle.

Schoop, G., & Stolz, A. (1940). Behandlungsversuche mit Lachesis Bengen bei Pararauschbrand und Novyödem. [**Treatment of Malignant Oedema by Lachesis**].—*Dtsch. tierärztl. Wschr.* **48.** 108–110. [1 ref.]

The venom of the American snake *Lachesis muta* has been reputed to be of value in the treatment of septicaemic and haemorrhagic infections. G. pigs were inoculated with cultures of *Clostridium septique* and *Cl. novyi* and treated by the subcutaneous injection of the venom. The commercial product was administered in doses of 1 c.c., 0·6 c.c. and 0·3 c.c. of the solution either at the time of inoculation, or three hours before, or three hours after inoculation, but no influence on the infections could be detected.—U. F. Richardson.

Levaditi, C. (1938). L'activité thérapeutique des dérivés benzéniques sulfurés dans les maladies provoquées par les ultravirus. [**The Therapeutic Value of Sulphonated Aromatic Derivatives in Virus Diseases**].—*C. R. Soc. Biol. Paris.* **127.** 958–960.

The use of various sulphonated aromatic derivatives, principally of the sulphamide, sulphone or sulphoxide class, in certain virus diseases induced in g. pigs or mice, was shown to be without appreciable effect, in contrast to their marked action in streptococcal, pneumococcal, meningococcal and gonococcal infections. Certain beneficial effects were noticed in foot and mouth disease and in inguinal lymphogranulomatosis by the use of sulphanilamide and more especially by 4-sulphamido-2-4-diaminoazobenzene and by 4-sulphamidophenylazo-3-5-diaminobenzoic acid.—Alfred Eden.

Neitz, W. O. (1940). **Uleron in the Treatment of Heartwater.**—*J. S. Afr. vet. med. Ass.* **11.** 15. [1 ref.]

Very favourable results were obtained by the use of uleron in the treatment of heartwater in sheep under experimental conditions. Thirty-nine out of 41 recovered, whereas 26 out of 37 untreated sheep died. The best results were obtained when the drug was given on the first or second day of the fever reaction. Treated sheep developed a solid immunity. The drug will only dissolve satisfactorily in a 1% sodium hydroxide solution. The dose is 1 g. per 50 kg. body weight, which would be about 6 g. in 60 c.c. of sodium hydroxide solution for a young sheep of average size.—E. M. Robinson.

Neitz, W. O. (1940). **The Influence of Arsenical Compounds on the Development of *Rickettsia ruminantium*.**—*J. S. Afr. vet. med. Ass.* **11.** 11–14. 1 table. [13 refs.]

N. refers to several arsenic antimony compounds prepared by Schmidt [*V. B.* **8.** 619.], which had very high chemotherapeutic indices in the treatment of *Bartonella muris* infection in rats. On account of certain analogies between *Bartonella* and *Rickettsia*, he tried " Sdt. 386 B " on sheep infected with heartwater, by intravenous inoculation on the first or second day of the reaction. No beneficial effect was observed. On the contrary, the symptoms were accentuated and death was accelerated. A somewhat similar effect followed the use of neosalvarsan. These drugs would, therefore, be contra-indicated in the treatment of heartwater. [For information on Sdt. 386B, see Findlay, G. M. (1939). " Recent Advances in Chemotherapy." p. 483. London: J. & A. Churchill Ltd. (2nd Edit.)]—E. M. Robinson.

PYMAN, F. L. (1937). **Chemotherapy of Amoebicides.**—*Nature, Lond.* **140.** 832–834. [11 refs.]

The technique developed by LAIDLAW, DOBELL and BISHOP [(1928). *Parasitology.* **20.** 207.] for testing amoebicides *in vitro* was used to examine a number of compounds to determine their amoebicidal activity for *Entamoeba histolytica.* It was found that a derivative of decane, tetra-*n*-amyldiaminodecane (T.A.D.D.) possessed 3–5 times the activity of emetine, the principal drug used in the treatment of amoebic dysentery, when the pH of the *in vitro* tests was kept at 6·2 or 6·3. The toxicity of T.A.D.D. to mice was only one tenth of the toxicity of emetine when administered orally, and one sixth on subcutaneous injection. Its therapeutic index was, therefore, much more favourable than that of emetine, but when clinical trials were carried out it was found that, although T.A.D.D. had some action in amoebic dysentery when administered orally, it was not sufficiently active to be of any real value. It is thought that if a comparison of the amoebicidal activity of the two substances were made in a faintly alkaline medium instead of a slightly acid one, a better indication of their relative clinical value would be obtained.

—R. ALLCROFT.

BEVAN, L. E. W. (1940). **The Chemoprophylaxis of Trypanosomiasis.**—*Vet. Rec.* **52.** 257–259. [12 refs.]

Referring to a statement in an annotation published in the *Lancet* [(1940). **238.** 180.] that a " biological immunization of man against sleeping sickness seems impracticable " B. points out that this occurs as immunity tolerance in natural conditions in man and animals but that carriers are created. Immunity tolerance can be set up in cattle by chemotherapeutic means. Carriers are also created and breakdowns occur. From experiments which he carried out, B. concludes that a definite and lasting immunity could be produced by Bayer 205 or antrypol against polymorphic varieties and believes that immunity is due to an interaction between the drug, the trypanosomes and the tissues of the host. He has found that immunity is related to the number and virulence of the trypanosomes and the quantity of the drug administered. If few trypanosomes and a subcurative dose are given relapses occur and if the doses are continued at each relapse, the parasite becomes resistant to the drug and the animal succumbs. If trypanosomes are numerous in the peripheral blood and the maximum dose is given, the animal may be sterilized of parasites and become resistant to reinfection. A state of sterile immunity is set up which is reinforced by subsequent reinfection. Various drugs are specific for different species of trypanosomes and when principles are better understood a drug effective against all trypanosomes may be produced.—S. J. GILBERT.

VAN DEN BRANDEN, F. (1940). Giftigheidsproef van Germanine (Bayer 205) en gelijksoortige producten (309 Fourneau of Moranyl, Belganyl). [**Toxicity Tests with Germanin (Bayer 205) and Similar Products, Moranyl (Fourneau 309) and Belganyl**].—*Ann. Soc. belge Méd. trop.* **20.** 91–92. [In Dutch: French summary].

The author has altered his previous method of testing [*V. B.* **9.** 894.] because of variations found in the toxicity of different samples of germanin and belganyl. The following procedure is proposed :– five white mice of about 20 g. are accurately weighed and a dose corresponding to 0·4 g. per kg. in a 5% solution of the drug in twice-distilled water is slowly injected intravenously. Six days later three mice should be still alive.—J. E.

BRUMPT, E., BOVET, D., & BRUMPT, L. (1937). Action des médicaments antipaludiques sur l'infection de la poule par le *Plasmodium gallinaceum*. [**Action of Anti-Malarial Drugs on Avian Infection with** *P. gallinaceum*].—*Festschrift Bernhard Nocht, 1937*. pp. 61–66. 3 figs. [4 refs.] Hamburg: Friederichsen de Gruyter & Co. [In French].

It has been found that one dose of quinine, plasmoquine, rhodoquine, or atebrin, causes a rapid decrease in the malarial parasites circulating in the blood of fowls infected with *P. gallinaceum*, the first two acting mainly on the asexual forms and the last on the sexual elements. No further treatment is necessary, as the developing immunity of the bird is then sufficient to ensure recovery. Used prophylactically, however, the anti-malarial drugs do not prevent infection, and appear to have no action until the parasites become relatively numerous. This is in contrast to the protective action of these drugs in malaria of man and of passerine birds. It is suggested that the difference may depend on the fact that, in the fowl, the birds' own immunity response is a factor in recovery, or it may be connected with the fact that, in fowl malaria, the parasites invade endothelial cells as well as the erythrocytes.—U. F. RICHARDSON.

CHABAUD, A. (1940). Action de deux nouveaux composés arsenicaux sur la spirochétose des poules. [**Effect of Two New Arsenical Compounds on Fowl Spirochaetosis**].—*Bull. Soc. Path. exot.* **33.** 243–245. [1 ref.]

C. gives the graphic formulae of two new arsenical compounds (no. 389 and no. 425). Both were tested for their spirochaetocidal effect on hens artificially infected with *Sp. gallinarum*. Product no. 389 was used on three hens in doses of 0·3, 0·6 and 0·7 g. per kg. body weight. The smallest dose dispersed the infection in 24 hours, while toxic symptoms and a delayed action resulted from the larger doses. All three birds recovered. Product no. 425 was used on five hens in doses of 0·004, 0·005, 0·006, 0·007 and 0·01 g. per kg. body weight. In all cases spirochaetes disappeared from the blood within 24 hours, the smaller doses giving slightly quicker results. Four out of five control birds died within 48 hours.—C. V. WATKINS.

I. HOLMBERG, J. (1936). Vergleichende Untersuchungen mit dem Häkchenverfahren u. der Derriswaschung zur Dasselbekämpfung bei Niederungsrindern. XI. Beitrag. Dasselhäkchen; Derrilavol, Derrophen, Derrisol. Abdassol; Dasselpulver A, Dasselmittel "Pyro", Dasselmittel Nr. 60, Baravol. [**Control of Ox Warbles in Lowland Cattle by the Hook and Derris-Wash Methods. XI.**]—*Inaug. Diss., Hanover*. pp. 70. 10 tables. [Numerous refs.]

II. FREYER, H. J. (1937). Versuche zur Bekämpfung des Dasselbefalls beim Rinde. XII. Beitrag. (a) Die Auswirkungen der Entdasselung 1936 auf den Befall 1937. (b) Derris-, Barbasco,-Phenolpräparate und mechanische Abdasselung. [**Control of Ox-Warble Flies. XII. (a) Results in 1936. (b) Derris, "Barbasco", and Phenol Compounds, and Mechanical Means**]. —*Ibid.* pp. 33. 12 tables.

III. BECKH, A. (1938). Dasselbekämpfungsversuche mit Kochsalz. [**Salt as an Ox Warble Larvicide**].—*Tierärztl. Rdsch.* **44.** 27–28. 2 tables. [2 refs.]

I. 33% of 3,362 cattle examined averaged 18 warbles per animal. Wash treatment took 2–4 minutes, 200–350 c.c. being required for each animal. Double washing was at a three-day interval. Results were observed 6–20 days after treatment. Using derris preparations (double wash), efficiency was high (95–99%), the best agents being "Derrilavol" and "Derrophen" (4% solutions). Results

were good with a single wash of " Derrilavol " but less good with other preparations or with the hook. A new preparation " Baravol ", made from the root of the South American plant, barbasco or wild cinnamon (*Canella winterania*), gave fairly good results with a single wash ; a double wash was not tested.

For a big campaign, H. recommends a combined method in which moderately affected animals are treated with the hook, while heavily infested animals and those with many small early-stage warbles are treated by a single wash.

II. F. made tests in the same districts as did HOLMBERG [see I, above]. It was uncertain whether the 10% decrease in warble incidence in 1937 was due to the previous year's campaign, or to climatic conditions. Inspection in June of animals treated in April showed that a further batch of warbles had developed in some. These could only be eliminated by a further dressing in June or July—a difficult proposition, since all cattle were then out on the plains.

Various commercial preparations were tested. Derris washes were effective ; the " barbasco " preparation " Tutanol " and a commercial derris ointment were not so effective. Phenol compounds proved to be quite unsuitable. F. considers the mechanical method to be efficient only when done by a highly trained staff, and even then to be less effective than the derris wash method.

III. Rubbing in of salt was effective in killing young, unpigmented larvae, but the effect was probably due largely to the massage itself rather than to the agent used. Older larvae were unaffected. Injection of salt solutions into the swellings was also tried. Results did not justify the trouble taken, and neither method was considered of practical value in warble control.—H. E. HARBOUR.

SEN, S. K. (1939). **The Possibilities of Cattle Fly Sprays in India.**—*Indian J. vet. Sci.* **9.** 339–348. 2 figs., 1 table. [6 refs.]

The efficiency of a number of fly sprays was tested on a herd of Sahiwal cows during October 1936 and 1937. The most effective formula was found to be :– 92 gal. high speed Diesel oil, 3 gal. pine oil and 5 gal. " pyrocide ' 20 ' ". 60 c.c. per cow daily repelled not only *Lyperosia exigua* and *Musca crassirostris*, but also all non-biting flies.

The effect of the spray on milk yield was tested on four Sahiwal cows, with four controls, spraying being carried out daily for 21 days, and the average milk yield being recorded for three weeks immediately before and after the experiment. During the spraying period there was an average increase of 1·6 lb. of milk daily in the test animals and a decrease of 0·2 lb. in the controls. The milk yield of the test cows decreased in the subsequent three weeks, but it was appreciably higher than in the controls.

The cost of the spray imposes a limitation on its general use. It is possible, however, that a much smaller volume than 60 c.c. would be equally effective in practice.—D. D. OGILVIE.

EAGLESON, C. (1940). **Livestock Sprays. A Rapid Method for Determining the Toxicity.**—*Soap.* **16.** No. 7. 96–99 and 117. 6 figs., 1 table. [4 refs.]

Many livestock sprays, giving satisfactory results when tested by chamber methods designed for household sprays, prove unsatisfactory for the control of houseflies (*Musca domestica* L.) and stableflies (*Stomoxys calcitrans* L.) when sprayed in barns and sheds. This is probably due to certain toxicants' giving a much lower percentage of mortality where ventilation is good than where it is poor.

A technique is described for assaying the insecticidal power of livestock sprays, wherein emphasis is placed on the provision of forced ventilation of the insects during spray application and the observation period. The object is to achieve better simulation of conditions under which livestock sprays are used.

From 14–20% less mortality was observed among houseflies when well aerated after spraying than when protected from currents of air. It was found that the chemical assay of toxicants is not an entirely adequate or dependable index of toxicity of livestock sprays.—W. MOORE.

WEED, A. (1940). **Pyrethrum Deterioration.**—*Soap.* **16.** No. 7. 101–103. 1 table.

One of the limitations of pyrethrum for use as an insecticide is that it gradually loses its toxicity on storage through the decomposition of its active principles, the pyrethrins. In general, low grade powders, containing about 0·6% pyrethrins, lose about 15% of their active principles in a year, whereas a good grade, containing 1% pyrethrins, loses about 20% in the same time. The high grade powders, such as Kenya pyrethrum, which contain 1·5% pyrethrins lose about 25% of their toxicity in a year. The rate of decomposition is most rapid during the first six months of storage.—W. MOORE.

MAHAL, H. S. (1937). **Antiseptics and Anthelminthics. Part III. Pharmacology of Certain Flavones with Special Reference to their Anthelminthic Action.** —*Proc. Ind. Acad. Sci.* Sect. B. **5.** No. 5. 186–194.

The anthelmintic action of certain flavones, *viz*, calycopterin, chrysin, genkwanin, 7-hydroxyflavone, 6-hexyl-7-hydroxyflavone, and 4-methylumbelliferone was studied *in vitro* by (1) directly immersing roundworms, tapeworms, and leeches in different concentrations of solutions of the substances, and (2) by the use of DALE and LAIDLAW's apparatus (1912). The experimental results showed that the compounds had no anthelmintic properties. Other physiological actions of these compounds were studied, and it was found that they inhibited the movements of isolated gut and uterus ; intravenous injection into dogs caused depression of the blood pressure, contraction of the uterus, and increased the movements of respiration.

A study of the effect of chrysin, genkwanin and 4-methylumbelliferone on the growth of *Bacterium coli*, and the Rideal-Walker test, showed that these compounds possessed no antiseptic or germicidal properties.—R. ALLCROFT.

ARBOLEDA, C. A. C. (1939). La medicación cupro-arsenical en el tratamiento de la strongyloidiasis gastro-intestinal de los terneros. [**Copper-Arsenic Therapy of Gastro-Intestinal Strongylosis of Calves**].—*Rev. Med. vet., Bogotá.* **9.** 379–407. 6 tables. [16 refs.]

Calves under 1 year of age were given 30 ml., those of 1–1½ years 40 ml. and those of 1½–2 years 50 ml. of the following :– sodium arsenite 3·5 g., copper sulphate 18 g., citric acid 15 g. in 900 ml. of water. The dose was further diluted with a little water before being given. Treatment was repeated three times at intervals of 15 days and then given once a month. The result was beneficial and no case of poisoning was noted after eight months' administration.—G. WILLIAMSON.

I. GROULADE. (1939). Traitement de la vaginite granuleuse par la dilatation gazeuse. [**Treatment of Granular Vaginitis by Dilatation by means of a Gas**].—*Bull. Soc. vét. prat. Fr.* **23.** 27–35 and 54–55. 1 fig., 1 table.

II. DAVESNE. (1939). La vaginite granuleuse est-elle une entité morbide ? [**Is Granular Vaginitis a Disease Entity ?**].—*Ibid.* 64-67.

I. This treatment is non-irritant and the agent reaches the point where its presence is desired. This is attained by the use of a colloidal silver preparation which is decomposed *in vivo* by an oxidizing agent, hydrogen peroxide ; free

oxygen is liberated which distends the mucous membrane, dilates the lacunae, and allows the now ionized silver to reach and penetrate the diseased mucous membranes.

The technique and instruments used are described in detail, as is also the treatment of 38 chronic and two acute cases of which 34 are recorded as cured. Treatment is carried out every second day on three occasions for chronic cases: in acute cases with much purulent discharge, six applications may be required.

II. D. argues that the nodules and granulations which are considered typical of the disease are, in fact, not pathological, but are physiological expressions of a reflex stimulus produced, perhaps, by a distant pathological condition. In support of this contention, he offers the fact that authorities are not agreed as to the distant effect which the local condition is supposed to bring about, that affected cows may or may not be sterile, that the so-called specific streptococcus is ubiquitous, that success is claimed for innumerable forms of treatment none of which gives any better results than a banal symptomatic method, and that in every case diagnosed by others which he has investigated, he was able to establish a cause for sterility other than that of granular vaginitis.—G. Williamson.

Kleinberg, W., Gordon, A. S., & Charipper, H. A. (1939). **Effect of Cobalt on Erythropoiesis in Anemic Rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 119–120. [1 ref.]

Rabbits were rendered anaemic by (1) repeated bleedings, and (2) daily injections of benzol. Each group was divided into two: half served as controls and the other half was injected daily with 50 mg. $Co(NO_3)_2.6H_2O$. The untreated animals in (1) re-attained a normal blood count within 25 days, the Co-treated in 15 days with red blood corpuscle counts rising well above normal during the next ten days. In (2) the benzol injections were continued until the controls reached an almost fatal low level in 50 days: in the Co-treated animals normal levels were regained after four weeks, despite the continued benzol treatment. Marked hyperplasia of the bone-marrow resulted and the effect of the Co seemed to be stimulation of erythrogenic precursors in the marrow.—Alfred Eden.

von Wajgiel, E. R. (1938). Meine Erfahrungen mit der Einspritzung von Trichloressigsäure zwecks Heilung gutartiger Geschwülste. [**Treatment of Benign Tumours with Trichloracetic Acid Injections**].—*Wien. tierärztl. Mschr.* **25.** 617–621. [1 ref.]

In the course of ten years papillomata, granulomata and pedunculated fibromata in 176 horses, dogs and cattle were successfully treated by the application and injection of 1–2 drops of a 0·5–20% solution of trichloracetic acid. No recurrence was observed. Trichloracetic acid was found preferable to other caustic agents such as nitric acid, chromic acid or silver nitrate, because of slower precipitation of surface proteins and better penetration into deeper tissue.—V. C.

POISONS AND POISONING

Lewis, H. B., Schultz, J., & Gortner, R. A., Jr. (1940). **Dietary Protein and the Toxicity of Sodium Selenite in the White Rat.**—*J. Pharmacol.* **68.** 292–299. 3 figs. [9 refs.] [Authors' summary copied *verbatim*].

1. Diets containing 30 per cent of casein afforded significantly more protection to young white rats against selenium intoxication (sodium selenite at levels of

25 to 50 p.p.m. selenium) than did diets of equal caloric value containing 6 per cent of casein. This protection was manifested by longer periods of survival and less marked effects on growth.

2. Methionine (0·45 to 0·89 per cent) added as a supplement to the 6 per cent casein diet containing selenium also afforded similar protection. Cystine added to the diets in amounts equivalent to methionine did not significantly increase the period of survival or improve growth in the presence of selenium.

3. Supplementary methionine, added to a selenium-containing diet, whose protein was supplied by arachin, a protein notably low in its methionine content, at a 15 per cent level, afforded protection against the toxic effects of selenium.

4. These experiments suggest that the character of the dietary protein and protein supplements may materially modify the toxicity of inorganic selenium compounds.

MILLER, W. T., & WILLIAMS, K. T. (1940). **Minimum Lethal Dose of Selenium, as Sodium Selenite, for Horses, Mules, Cattle, and Swine.**—*J. agric. Res.* **60.** 163–173. 2 tables. [4 refs.]

The toxicity of selenium in the larger domestic animals has been tested in view of its identity with the so-called " alkali disease " of livestock occurring in areas of the north central Great Plains of the U.S.A. As sodium selenite it was given orally in large single doses to horses, mules, cattle, and swine and the dosage was reduced until the M.L.D. was reached. Expressed in mg. per lb. body weight, this was found to be about 1·5 for the horse and mule, 4·5–5 for cattle, and 6–8 for swine. The symptoms of acute poisoning are not particularly characteristic, and death is due to asphyxia. A fat animal given the same amount of selenium per lb. body weight as a thin one receives a larger dose in relation to the total blood volume because of the avascularity of fat tissue, and so has a correspondingly poorer chance of survival. Gross P.M. changes common to all species were black-coloured blood, haemorrhages in the heart, and subcapsular haemorrhages on the spleen. A table is given showing the selenium content of body tissues and fluids.—R. BAMFORD.

ST. JOHN, J. L., MCCULLOCH, E. C., SOTOLA, J., & TODHUNTER, E. N. (1940). **Toxicity to Sheep of Lead Arsenate and Lead Arsenate Spray Residues.**—*J. agric. Res.* **60.** 317–329. 5 tables. [15 refs.]

Losses among sheep and cattle have occurred when the animals are pastured on sprayed orchards during autumn. Sheep maintained in metabolism crates on a basal ration were given lead arsenate at various levels daily. The lead arsenate, which was given orally in capsule, was in the form of a commercial product used for orchard spraying and contained 59·6% lead and 21·5% arsenic. Nine sheep were fed amounts varying from 2–0·25 g. daily ; those given 1 g. and 2 g. daily died within a few days, having received about 1·5 g. arsenic (2 g. As_2O_3). One animal given 0·25 g. daily lived for 35 days, and another, which received the same quantity daily for 94 days, survived for ten months when it was slaughtered. A total of 1·5 g. arsenic in the form of lead arsenate appears to be approximately a lethal dose when fed in small amounts daily. This is equivalent to about 41·0 mg. arsenic (As) or 192 mg. lead arsenate per kg. body weight. Tables are included showing the amount of lead and arsenic eliminated in urine and faeces and the quantities of these elements found in the stomach and other organs on autopsy. Apples added to the basal ration had no apparent effect on the toxicity or elimination of lead and arsenic.—R. BAMFORD.

NICOLAUS, W. (1938). Zur Frage der Entstehung der toxischen Leberdystrophie bei Schweinen infolge Lebertranfütterung. Fütterungsversuche mit Lebertranemulsionen an Ferkeln. Teil. I. [**Genesis of Toxic Dystrophy of the Liver in Swine Caused by Ingestion of Cod-Liver Oil. I. Feeding Tests of Piglets with Cod-Liver Oil**].—*Arch. wiss. prakt. Tierheilk.* **73.** 428–460. 14 figs., 8 tables. [Numerous refs.]

There are two forms of toxic dystrophy of the liver. The peracute form, accompanied by jaundice, is fatal after two hours at the most; on section the liver shows a mosaic pattern. The chronic form can be recognized only P.M., when small dystrophic foci may be found in the liver. After repeated attacks the liver shows scars (cirrhosis) and newly formed liver tissue.

German pure-bred white pigs are particularly susceptible to the disease. The disposition seems to be hereditary and it is considered that the boars are responsible for its transmission. Cross-breds are less susceptible and high-bred phenotypes more susceptible than the average. It does not occur in native farm pigs (*Landschweinen*). Only young animals weighing up to 35 kg. are affected.

The disposition to the disease is based on the tendency of the animals to eliminate glycogen very rapidly. The degree of susceptibility shows individual variations. The condition can occur in susceptible pure-bred piglets even though no cod-liver oil is given.

Apparently the disposition to the disease is linked with the fattening capacity. If the disposition is great enough there is no need for a further precipitating factor (*e.g.* administration of cod-liver oil).

Treatments which reduce the glycogen content of the liver (thyroxin and insulin taken while fasting, or fasting alone), favour the disease; it has no connexion with the anaerobic haemolytic intestinal flora (*Clostridium welchii*). Nor does the quality or type of cod-liver oil emulsion or food, or the conditions in which the animals are kept, influence in any way the incidence of the disease.

The disease appears at the earliest five days after the beginning of cod-liver oil feeding and most deaths occur between the fifth and tenth days. But deaths may occur even some time after conclusion of the cod-liver oil feeding. Deaths are more frequent in winter because more cod-liver oil is usually given then. The addition of toluylene diamine to the cod-liver oil decreases the tendency to this disorder.

Attempts to bring about the condition by other oils (ol. pedum lauri, bone oil) were unsuccessful, even under unfavourable nutritional conditions.—V. CHLÁDEK.

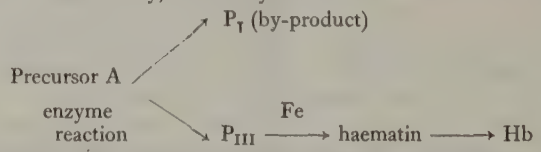
JÄNEL, H. (1938). Behandlung gelbkreuzbenetzter blutender Hautwunden. [**Contamination of Skin Wounds with Mustard Gas and Treatment of the Resultant Injury**].—*Z. Veterinärk.* **50.** 506–514. 1 fig., 1 table. [4 refs.]

Experiments with horses, dogs and g. pigs showed that, when the skin was incised and the bleeding wounds were exposed to mustard gas, the bleeding did not completely prevent the penetration of the toxic substance and that blood did not completely decompose the poison by hydrolysis. The healing process was delayed and rendered difficult. Early treatment with fresh filtered losantin solution (5%) [composition not stated] acting for five minutes, and subsequent rinsing with water, daily cleaning of the wound and application of neutral ointments resulted in healing only a few days later than non-contaminated control wounds.—V. CHLÁDEK.

PHYSIOLOGY

RIMINGTON, C. (1938). **An Enzymic Theory of Haemopoiesis.**—*C. R. Trav. Lab., Carlsberg.* **22.** 454–464. 4 figs. [Numerous refs.] [In English].

After a brief discussion of the chemical structure of the four isomeric aetioporphyrins, R. mentions that derivatives from only two, the I and III series, are found to occur in nature, and it is impossible for a series III pigment to have derived from a series I origin or *vice versa.* In his enzymic theory of haemopoiesis, R. postulates an unknown pyrrole precursor A giving rise by enzymic activity to P_{III} derivatives in the main and to P_I derivatives, quantitatively inferior, as a by-product; the latter include the small amount of coproporphyrin I found in normal urine. Schematically, the theory is :–



Some evidence from personal ob ervations and from the literature is adduced in support.

Mention is made of various pathological conditions in which porphyrin excretion is increased, and of the type of pigment excreted. In congenital porphyrinuria the enzyme system is considered deranged or lacking, yielding more of the by-product P_I and accounting for the increased series I pigment excretion. In Pb poisoning and acute idiopathic porphyrinuria the bone marrow is affected and the conversion of P_{III} to haematin does not occur, with consequent increased P_{III} excretion. In various types of anaemia some impairment of the A$\longrightarrow P_{III}$ enzyme system is postulated. R. admits that this enzyme theory of haemopoiesis is incomplete and its many imperfections are clearly realized, but claims that it has some value in pointing to various suggestive lines of investigation and in stimulating fundamental research into the chemistry of blood pigment formation in the embryo and adult animal.—ALFRED EDEN.

MCDONALD, Jean G. (1939). **Avian Bone Marrow with Particular Reference to Red Cell Development.**—*Amer. J. Anat.* **65.** 291–307. 10 figs. on 2 plates. [Numerous refs.] [Abst. from author's summary].

The erythrocytopoietic sinusoids of normal pigeon bone marrow are lined by large basophilic cells. Studies of marrow imprints reveal that these "lymphoid" elements are proerythroblasts and basophilic erythroblasts. True stem cells are present only in extremely small numbers. The megaloblast series is not represented.

Induced hypoplastic marrows undergoing restoration exhibit hypertrophy of the reticulo-endothelial elements of the erythrocytopoietic sinusoids. Proerythroblasts form directly from the enlarged sinusoidal lining cell without passing through the myeloblast stage.

The so-called "intersinusoidal capillaries" (erythrogenic capillaries of Sabin and associates) represent intercellular stromal spaces—open to the venous sinusoids and lined by cells of the histiocytic system. Red cell development within the stromal spaces parallels that observed in the sinusoids of regenerating marrows.

I. Quin, J. I., van der Wath, J. G., & Myburgh, S. (1938). **Studies on the Alimentary Tract of Merino Sheep in South Africa. IV. Description of Experimental Technique.**—*Onderstepoort J. vet. Sci.* **11.** 341–360. 16 photographs. [Numerous refs.] [For part III, see *V. B.* **7.** 86].

II. Quin, J. I., & van der Wath, J. G. (1938). **Studies on the Alimentary Tract of Merino Sheep in South Africa. V. The Motility of the Rumen under Various Conditions.**—*Ibid.* 361–370. 27 graphs. [Numerous refs.]

I. After describing the technique employed by other workers for making observations on digestion by operative measures, the authors give details of their own technique. Ebonite fistula tubes were found to be the most suitable, and permanent closed fistulae were made at different levels of the digestive tract of merino sheep. A method was devised whereby pressure changes within the rumen could be accurately recorded. Recordings of the volume of gas in the rumen and analyses of it were made. A study was made of the digestion of various food materials introduced through fistulae into the rumen in bags of thin silk.

II. Studies were made on ruminal movements in sheep with ruminal fistulae. Feeding, and in some cases even the sight of food, cause a significant acceleration in ruminal movements. Starvation has little effect on ruminal movements for 3–4 days, but after that interval they may completely cease. Water does not affect movements significantly, nor does the temperature of the water appear to be of any importance. Profound changes in the movements are caused by small doses of copper sulphate placed on the back of the tongue. Lentin and " esmodil " cause a well marked stimulation of ruminal movement. Acetylcholine causes an acute though temporary paralysis.—E. M. Robinson.

Graham, J. D. P. (1939). **The Air Stream in the Lung of the Fowl.**—*J. Physiol.* **97.** 133–137. 1 text fig., 1 fig. on 1 plate. [5 refs.]

In order to investigate the direction of the flow of air during respiration in birds, powdered bismuth carbonate (a radio-opaque dust) was introduced into the trachea during inspiration, and about 1 g. into the left posterior thoracic air sac of an anaesthetized fowl. The thorax was closed and the bird left for one hour during which time the expiratory air currents in the left posterior thoracic sac distributed the bismuth powder along the course of the air stream. The bird was then killed, and stereoscopic skiagrams of the carcass were taken. Figures obtained by analysis of samples of gas withdrawn by needle from the air sacs at the end of inspiration and analyzed in a portable Haldane apparatus, indicate that the major proportion of gaseous interchange takes place during expiration and only slight gaseous exchange occurs during inspiration. Examination of the photographs showed that in the fowl, air enters the air sacs during inspiration *via* the main bronchial channels as a result, in part at least, of the bellows-like action of the air sacs. On expiration the air is driven from the air sacs *via* the recurrent bronchi through the parabronchial air capillaries and gaseous exchange is completed.

A brief synopsis of the anatomy of the lungs of the bird and the controversy regarding the mechanism of respiration is given.—R. Allcroft.

Silberberg, M., & Silberberg, Ruth. (1939). **A Comparison of the Effects of Anterior Pituitary Hormone on Skeletal Tissues of Young and Mature Guinea Pigs.**—*Amer. J. Path.* **15.** 547–560. 8 figs. on 4 plates. [7 refs.] [Authors' summary copied *verbatim*].

In the euhyaline cartilage of sexually mature guinea pigs anterior pituitary extract of cattle causes both proliferative and retrogressive changes similar to those

found in immature guinea pigs. With increasing age of the animals the tendency of the hormone to produce proliferation of the cartilage decreases, whereas the tendency to call forth degeneration increases. The retrogressive changes increasing with advancing age consist of liquefaction and formation of cysts in the cartilage, as well as of ulcerations on free surfaces of the cartilage of the joint. Regenerative growth of the cartilage is stimulated even in old animals by injections of anterior pituitary extract. Organization of the areas of degeneration takes place by means of ingrowth of vascularized connective tissue, or by ossification, or by both of these processes. Thus, an anterior pituitary hormone is able to produce in older guinea pigs severe arthropathic lesions, which, once they have been initiated, may be aggravated by mechanical factors in association with non-specific regenerative processes. These various factors may stimulate the growth of connective tissue, which is able to dissolve and replace preëxisting bone. In the epiphysis the rarefaction of bone, followed by retrogressive changes in the connective tissue which had invaded and replaced the bone, may give rise to the formation of cysts.

KORENCHEVSKY, V., & ROSS, M. A. (1940). **Kidneys and Sex Hormones.**—*Brit. med. J.* April 20th. 645–648. 2 tables. [Numerous refs.]

Investigations carried out on large numbers of rats showed that not only were the weights of endocrine organs influenced by sex hormones but also the weights of other organs (liver, kidneys and heart).

Gonadectomy in males caused a definite decrease in the size of the kidneys due to slight atrophy of the tubular secretory apparatus in these organs, but a similar change did not occur in ovariectomized rats.

Injections of the male hormones (androsterone and esters of testosterone) produced true hypertrophy of the kidneys in both normal and gonadectomized female rats and in castrated males; the effect was clearly nephrotropic. Except for very slight pathological changes in the kidneys of normal females after large doses of testosterone esters, these hormones appear to have not a harmful, but a definitely beneficial, effect on the kidneys. When oestradiol esters were injected for prolonged periods, peculiar cyst-like degenerative changes occurred in the kidneys, mostly confined to the boundary layer of the cortex and medulla; these structural changes indicate that oestrogens have a toxic, not a nephrotropic, effect on these organs.

A statistical analysis of the results is given, and the possible chemical application of the nephrotropic properties of male hormones is discussed.—R. ALLCROFT.

TECHNIQUE AND APPARATUS

SCHUMACHER, A. (1938). Ueber die desinfizierende Wirkung der "Oligodynamischen Silbertabletten" der Firma Merck. [**Disinfectant Power of Merck's "Oligodynamic Silver Tablets"**].—*Wien. tierärztl. Mschr.* **25.** 485–486.

"Oligodynamic silver tablets", containing AgCl in dilutions of M/100 to $M10^{-7}$, when tested on *Bacterium coli* and on staphylococci by the suspension method of HÜPPE and VON ESMARCH, proved to have only one-tenth of the antiseptic effect of $AgNO_3$ in ordinary solution.—V. CHLÁDEK.

I. VOGLER, G. (1937). Beitrag zur elektiven Züchtung des Streptococcus agalactiae und der Brucella Bang. I. Mitteilung. [**Selective Cultivation of *Str. agalactiae* and *Br. abortus*. I**].—*Milchw. Forsch.* **19.** 130–134. 2 tables. [2 refs.]

II. KOHANE, O. (1937). Beitrag zur elektiven Zuchtung des Streptococcus agalactiae und der Brucella Bang. II. Mitteilung. [**Selective Cultivation of *Str. agalactiae* and *Br. abortus*. II**]. *Ibid.* 135–138. [4 refs.]

I. V. tested the value of salts of a large number of elements for the selective culture (by lethal action on contaminants) of *Str. agalactiae* and *Br. abortus*, using as contaminants *Str. lactis*, strains of micrococci, *Bact. subtilis* and *Bact. coli*. Only two were of any value, *viz.* 0·02 %, cobalt chloride and 0·1 %, lithium chloride, which inhibited all the contaminants and also *Br. abortus*, allowing a pure culture of *Str. agalactiae* to grow. None of the substances spared *Brucella* at the expense of the rest.

II. K. continued VOGLER's work [see I] and tested a number of other salts. The following were of use in obtaining pure cultures of *Str. agalactiae*: 0·05 %, nickel sulphate, 0·0025 %, tartar emetic, 0·0015 %, tellurium dichloride, 0·001 %, tellurium tetrachloride and 0·05 %, thallium chloride. *Br. abortus* was only spared at the expense of *Bact. coli* by the tellurium salts (0·0025 %), being otherwise less resistant than the other organisms.—J. E.

BESREDKA, A., & SALAMON, E. (1939). Milieu au jus d'epinard. [**Spinach Culture Medium**].—*Ann. Inst. Pasteur.* **62.** 194–196.

The preparation and chemical analysis is described of spinach liquid extract medium which is recommended as a substitute for peptone broth for the primary isolation and subculture of both aerobes and anaerobes. Twenty-two aerobic and eight anaerobic bacteria yielded good growth in the medium after incubation at 38°C. for 24 hours.—R. O. MUIR.

LONGLEY, B. J., CLAUSEN, N. M., & TATUM, A. L. (1939). **Cultivation of Various Species of Trypanosomes in the Developing Chick Embryo.** *Proc. Soc. exp. Biol., N.Y.* **41.** 365–366.

Trypanosoma rhodesiense, *T. equiperdum*, *T. brucei* and *T. evansi* were cultivated in developing chick embryos, and the strains did not lose their virulence, or in the case of *T. rhodesiense* their arsenic-fastness. A heavy trypanosome infection of embryo blood was regularly obtained, leading to death of the embryo in 4–5 days. Subcultures were made by transferring diluted embryo blood obtained aseptically on the fifth day. By this technique a *T. rhodesiense* strain was maintained for eight generations, and it is thought that it could have been maintained indefinitely. —U. F. RICHARDSON.

STONE, W. S., & THOMPSON, A. T. (1940). **A Method for Preserving Trypanosoma equiperdum.**—*Science.* **91.** 344.

Tryp. equiperdum can be kept viable and infective for 14 months by storing infected citrated rat blood in an ice-alcohol bath. About 5 c.c. of infected, citrated rat blood is introduced into a sterile 50 c.c. flask which is then introduced into a thermos bottle into which 2 gall. of ethyl alcohol and 20 lb. of CO_2 ice are placed. Additions of CO_2 ice are made once or twice weekly to maintain the bath.—U. F. R.

SHYROCK, E. H. (1940). **An Application of Le Masurier's Method of Staining Macroscopic Brain Sections. A Photographic Aid for the Teaching Laboratory.**—*Anat. Rec.* **76.** 291–293. 3 figs. [1 ref.]

Twenty-four consecutive cross-sections of a brain, each 4 mm. thick, were stained by Le Masurier's method. The posterior surface of each section was then photographed, the camera being at a constant distance from the sections, and the prints were mounted in a picture frame for permanent display. If a scale is

introduced with the first photograph, natural size can always be estimated regardless of the degree of enlargement.—C. W. Ottaway.

Berkson, J., Magath, T. B., & Hurn, Margaret. (1940). **The Error of Estimate of the Blood Cell Count as made with the Hemocytometer.**—*Amer. J. Physiol.* **128.** 309–323. 6 tables. [Numerous refs.]

The error of estimate of the blood cell count as made in routine practice was investigated, using a pipette of the Thoma-Zeiss type. For the erythrocyte counts, a photographic-mechanical method of counting was employed, but in the case of leucocytes eye counts were used, a preliminary investigation having demonstrated that eye counts and photographic counts were in practically perfect agreement. The error of an individual determination of the count when the enumeration itself is effected without error, measured as coefficient of variation in percentage, can be estimated for erythrocytes and leucocytes from formulae which are given.

—H. V. Hughes.

Gavrilov, W., & Nijs, J. (1939). Appareil à dessication à températures ordinaires et basses. [**Apparatus for Desiccation of Animal Tissue at Normal and Low Temperatures**].—*Ann. Soc. belge Méd. trop.* **19.** 527–531. 1 fig. on 1 plate. [5 refs.]

Details are given of a cheap, portable apparatus of simple construction for the vacuum desiccation in a few hours of virus-containing tissues at temperatures a little above or below 0°C. Constant temperatures of –4°C. and –10°C. were maintained for several hours by ice-$MgSO_4$ and ice-KCl mixtures respectively; the salts could be readily recovered by evaporation as a measure of economy. The apparatus is specially recommended for desiccation of tissue in tropical climates.—R. O. Muir.

Lea, D. E., & Haines, R. B. (1940). **The Bactericidal Action of Ultra-Violet Light.**—*J. Hyg., Camb.* **40.** 162–171. 4 figs., 1 table. [13 refs.]

Aqueous suspensions of *Bacterium coli*, *Bact. prodigiosum* and spores of *Bacillus mesentericus* were irradiated with monochromatic light of wave length 2537 Å. The survival curves obtained were exponential and the rate of death was accurately proportional to the intensity over an intensity range of 500 : 1. By comparing these results with data previously obtained on the action of X-rays on the same organisms, it was established that one ionization produced by X-rays is as effective as some hundreds of ultra-violet quanta. This is interpreted to mean that the quantum yield, in whatever chemical change leads to the loss of viability in the irradiated bacteria is, for 2537 Å, between 0·01 and 0·001. The authors believe that the action of X-rays and other ionizing radiations on bacteria is to be thought of as a lethal mutation involving a single "gene" molecule without general destruction of the cell.—J. M. Robson.

Filmer, J. F. (1940). **Testing Milking Machine Accessories.**—*N. Z. J. Agric.* **61.** 15–17.

This article describes the initiation of a scheme for the testing of the performance of milking machine accessories. A committee has recently been set up by the Minister of Agriculture to supervise generally research work to be conducted by the Department of Agriculture in connexion with milking machines. This includes the study of the effect of milking machines in the production of mastitis, and the study of the milking machine as a unit of dairy equipment, with a view to indicating lines along which some of its component parts may be standardized in the interests of economy and efficiency.

Those accessories whose performances can be measured by physical standards will be tested and a report issued to the manufacturer. Such accessories include vacuum gauges, relief valves, milk elevating devices, vacuum breaks etc.—L. F.

MISCELLANEOUS

AMMANN, K. (1939). Die Abteilung Tierheilkunde, Tierschutz, Tierversicherung und staatliches Veterinärwesen an der Schweizerischen Landesausstellung Zürich 1939. **[The Section for Veterinary Science, Animal Protection, Animal Insurance and State Veterinary Service of the Swiss Exhibition at Zurich, 1939]**.—*Schweiz. Arch. Tierheilk.* **81.** 285–295. 1 plate.

This is a descriptive article of the various exhibits and it contains much of veterinary interest. In 1939 there were 697 Swiss veterinarians of whom 544 were in practice. There were 114 students at the two veterinary schools of Zurich and Berne. Exhibits were arranged to demonstrate the principal animal diseases of the country.—J. E.

I. DAHMEN. (1938). Als Tierarzt im Iran. **[The Veterinary Surgeon in Iran]**. —*Dtsch. Tierärztebl.* **5.** 340–342.

II. ENDREJAT, E. (1939). Das Veterinärwesen in West-Iran. **[Veterinary Affairs in Western Iran]**.—*Ibid.* **6.** 321–324.

I. A continuation of the account begun previously [*V. B.* **8.** 183]. Professor Dahmen succeeded Dr. HAMEDY as Chief Veterinary Officer and he here describes the main tasks of the veterinary service :- to control contagious diseases of animals, to develop animal breeding and to organize veterinary education with the aid of a proper veterinary school. For the first two objects the country has been divided into ten districts, each to be in charge of a European whose duty it is to train 30–60 native assistants. The building of a new veterinary school at Keredz was begun in 1936.

II. E. is in charge of a large part of western Iran. He describes the geographical and climatic conditions, the livestock industry, and the veterinary organization, and gives a list of the principle diseases. Sheep are the most important animals and great use is made of their milk, fat and wool. There are no dairy cows, but draught oxen are used. Horses are reserved for travel (riding). There are no pigs, but many kinds of poultry are kept. Veterinary control of diseases is being developed with the aid of native assistants. The chief diseases are anthrax, pasteurellosis, blackleg, foot and mouth disease and rinderpest in cattle ; anthrax, strangles, glanders, dourine, piroplasmosis and influenza in horses ; anthrax, pasteurellosis, piroplasmosis, F. & M. disease and mastitis in sheep ; anthrax, piroplasmosis, F. & M. disease and pleuro-pneumonia in goats, and rabies in dogs, as well as the ubiquitous parasitic infestations.—J. E.

AIRES, A. A., & LIMA DO SACRAMENTO PRATAS, A. (1937). Bases orgânicas dos serviços de veterinária e indústria animal do império colonial português. **[Organization of the Veterinary and Livestock Service of the Portuguese Colonial Empire]**.—*An. Serv. vet. Pec. Angola, 1936.* pp. 5–21.

The authors discuss the need for a well organized veterinary service in the colonies in view of the special conditions prevailing there. They emphasize the fact that the natives are still the main stock owners and breeders, and that lack of hygiene and technical knowledge has caused losses to the animal industry in the past.

There is a veterinary department in the Ministry of Colonies which supervises and co-ordinates the work of the various colonial veterinary services. This department is directed by a veterinary officer with colonial experience.

Each colony has its own veterinary service and as that of Angola is fairly typical its local organization is described below.

There are headquarters with a staff of veterinary surgeons, technicians and clerks. Each district has its branch offices with veterinary officers, pharmacists, specialists in certain scientific subjects, and assistants, both European and African. There is a department of sanitary inspection with municipal inspectors who supervize animal sanitation and carry out such work as meat inspection and analysis of animal products. A central department is concerned with the economic side of the livestock industry, and is staffed by veterinary officers. There are central and regional laboratories, with staffs of veterinarians, technicians, specialists in certain scientific subjects and assistants. The service maintains a number of stock farms, studs, and zootechnical posts, which are suitably staffed and are concerned with problems of genetics, and with the distribution and loan of suitable animals for reproduction. These stations have suitable laboratories.

The Portuguese Colonial Veterinary Service has been organized with a view to supplying veterinary assistance to a varied, but largely illiterate, class of stock breeders. It is mainly concerned with preventive medicine and with the giving of advice on breeding matters. The service employs 57 veterinary officers, 25 being stationed in Angola. In small colonies such as Macao there is only one veterinarian and his work is, therefore, very varied.—MILLER WATSON.

VOLOSKOV, P. A. (1939). Vsesoyuznyĭ institut eksperimental'noĭ veterinarii na vsesoyuznoĭ S.-Kh. vystavke. [**The All-Union Institute of Experimental Veterinary Science at the All-Union Agricultural Exhibition**].—*Sovyet. Vet.* No. 5. pp. 8–10.

This is a description of the exhibits of the Institute at the Agricultural Exhibition in Moscow in 1939.—E. MARTIN.

CHEREDKOV, V. (1939). Leningradskii institut usovershenstvovaniya veterinarnykh vracheĭ. [**Leningrad Institute for the Post-Graduate Training of Veterinarians**].—*Sovyet. Vet.* No. 7. pp. 91–92.

The Institute has 13 professors and a staff of 29 lecturers. It gave post-graduate training to 2,884 veterinarians between 1931—when it was founded—and 1939.

The clinic connected with the Institute maintains close personal contacts with the Soviet farms and collective farms in its vicinity. 3,500 animals were treated during 1938.

The diagnostic laboratory of the Institute set up at the request of the farmers in 1938, carried out 841 examinations in 1939.—E. MARTIN.

WEISGERBER, F. (1939). Aufbau und Erfolge des Geflügelgesundheitsdienstes in Deutschland. [**Organization and Results of the Poultry Health Service in Germany**].—*Proc. 7th World's Poult. Congr., 1939.* pp. 406–410. Washington, D.C.: U.S. Dep. Agric. [In German: author's English summary copied *verbatim*].

The poultry health service is a measure for the protection of those agricultural poultry keepers who are buying their breeding stock from breeding stations of the Reich Poultry Pedigree Register and from stations for the production of breeding stock.

The direction of the poultry health service lies in the hands of 22 veterinary institutes all over the Reich. At the present time it controls the state of health of the poultry of over 1,200 stations, with a total of about 732,000 adult breeding hens. During the current year, this figure will be further increased through the addition of other stations, especially of stations for the production of hatching eggs.

Blood tests for pullorum disease were made at random on 10 percent of the poultry of those stations which are under the supervision of the poultry health service. When a large number of birds were found to be diseased, the entire flock had to be examined. In the future, 25 percent of the birds of the flock will be subjected to the blood test, and even in the case of one positive reaction, the entire flock will be tested. For this, the rapid whole-blood test is the method mostly preferred.

During 1938, 443,886 blood tests were made, and in 4·8 percent of the cases the reactions were positive. The blood tests showed that at the present time 41·8 percent of the flocks are entirely free from the white diarrhea of chicks, that 11·2 percent of the flocks are diseased up to 1 percent, and 47 percent above 1 percent. This indicates a considerable progress in comparison with the preceding year. Further important results may be expected from the new measures for 1939.

In the institutes entrusted with the sanitary control, 12,552 adult hens and 8,464 chicks from supervised flocks were dissected. Certain apprehensions regarding further spreading arose only in the case of the noninfectious leucosis with which 13·8 percent of the dissected hens were affected. Otherwise the state of health of our breeding stock may generally be regarded as good.

ZUMBRO, P. B. (1939). **A Coordinated Breeding and Pullorum-Control Program for the United States: The National Poultry Improvement Plan.**—*Proc. 7th World's Poult. Congr., 1939.* pp. 420–425. 2 tables. [2 refs.] Washington, D.C.: U.S. Dep. Agric. [In English]. [Author's summary copied *verbatim*].

Since July 1, 1935, the United States Department of Agriculture has been cooperating with official State agencies in the administration of the National Poultry Improvement Plan. Some of the general features of this plan are as follows:

1. The plan is Nation-wide in scope. It is entirely voluntary, and any poultry breeder or hatcheryman may participate by signing an agreement and complying with its provisions.

2. Provision is made for revising the plan every 1 or 2 years, and only those proposals that receive a majority vote of the cooperating States are considered.

3. Five progressive breeding stages and three progressive pullorum-control classes are provided.

4. Minimum requirements are established for each breeding stage and each pullorum control class.

5. Provision is made for improvement in production qualities through selection of breeding birds on the basis of physical appearance, physiological changes, production records, pedigree and progeny test.

6. Hatching eggs are carefully selected for size, shape, color, and freedom from tints.

7. Flocks, eggs, chicks, and hatcheries are subject to inspection at least once a year by official State inspectors who are employees of official State agencies.

8. All advertising is required to be submitted to and approved by the official State agency.

9. The official terminology of the plan applies in all parts of the country and is limited to those who are participating and complying with its provisions.

The plan is now in its fourth year of successful operation. At the present (March 31, 1939) breeders and hatcherymen in 43 States are cooperating in this national program. Last year 1,478 hatcheries with a hatching-egg capacity of about 60 million eggs were operated under the supervision of the plan, and more than 28,000 flock owners with approximately 6,000,000 breeding birds supplied eggs to these hatcheries. About 300 poultry breeders were trap-nesting more than 100,000 birds under U.S. Record of Performance supervision. The plan is resulting in reduced mortality among baby chicks from pullorum disease and improved quality in chicks with respect to production. Also purchasers are enabled to buy with more assurance of quality and satisfaction because of the uniform standards and terminology.

MELLANBY, E. (1939). **" The Experimental Method in the Conquest of Disease ".** —*Fight against Disease.* **27.** 14–28. 4 figs. on 2 plates.

The great advance made in chemotherapy and the control of disease due to results obtained from experiments on animals form the subject of this Stephen Paget Memorial Lecture. It is pointed out that nearly everything known about disease of the endocrine glands and the functions of the organs of the body resulted from animal experiments, as did also the rapid advance in the cure and control of streptococcal infections. Although a cure for cancer has not yet been found, those engaged upon the problem are certain that the experimental method is the principal route towards the solution of this problem.—R. ALLCROFT.

SCHEER, Celia. (1940). **Studies on the Occurrence of the V-Factor (Coenzymes I and II) in Normal and Pathological Spinal Fluids.**—*J. Immunol.* **38.** 301–308. 2 tables. [11 refs.]

Sixty-four spinal fluids of patients suffering from various diseases were examined for the presence of the V-factor; the growth of *Haemophilus influenzae* and *H. parainfluenzae* was used as an index for the presence of the factor which is an accessory growth factor required by the influenza bacillus.

No V-factor was found in 59 spinal fluids, and as various diseases were represented there was no reason to ascribe the absence of V-factor to a pathological condition, but its presence in four cases did seem to be connected with some pathological conditions. It is concluded that the V-factor which is present in the blood and brain does not pass through the meninges in normal adults, but that in certain pathological conditions this interference no longer exists.—R. A.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1938). **Report on the Work of the London School of Hygiene and Tropical Medicine (University of London) Incorporating the Ross Institute, for the Year 1937-38.** pp. 118. 4 plates, 4 appendixes. [Numerous refs.] London: London School of Hygiene and Tropical Medicine. [8vo].

Sections of interest are :–

DIVISION OF CLINICAL TROPICAL MEDICINE.—Studies of the action of the sulphanilamides on *abortus* fevers, endocarditis, and *Bacterium coli* and streptococcal infections have been published in a number of papers by MANSON-BAHR. Observations on the new blood pigment, pseudo-methaemoglobin were continued.

DEPARTMENT OF PARASITOLOGY.—This section was reorganized to incorporate the two separate Departments of Protozoology and Helminthology. Work on subclinical HELMINTHIASIS in Britain with special reference to trichinosis was continued.

DEPARTMENT OF BACTERIOLOGY AND IMMUNOLOGY.—TOPLEY and JOYCE WILSON in collaboration with GREENWOOD and BRADFORD HILL continued the study of experimental epidemics ; an attempt was made to determine the effect of variation in closeness and duration of contact on the spread of mouse TYPHOID.

Studies on the isolation of purified antigenic components from various bacteria are being conducted in collaboration with the Department of Biochemistry. Progress was made in further purification of fractions from the typhoid bacillus and from *Salmonella typhi-murium*, and arrangements made for field trials of the immunizing potency of the former fraction.

CRUICKSHANK and FREEMAN continued work on *Haemophilus pertussis*. The fraction obtained by alcoholic precipitation from a tryptic digest of the organisms was found to be a better immunizing agent, as tested in mice, than fractions obtained by extraction of the organisms with ethylene glycol or by peptic digestion. Mice immunized with this fraction were found to be protected not only against intraperitoneal injection of *H. pertussis*, but also against infection by the intranasal route. The fraction was found to be an efficient antigen for the complement-fixation test, a useful means of diagnosis in the later stages of the disease.

TOPLEY, JOYCE WILSON and HENDRY are attempting to isolate a purified immunizing fraction from *Erysipelothrix rhusiopathiae* (the organism of SWINE ERYSIPELAS).

G. S. WILSON and MAIER have made considerable progress in devising a suitable method for estimating the virulence of strains of *Brucella abortus*. The method, which depends essentially on the rate of clearance of the organisms from the body of the experimental animal, has been used to determine whether infection of g. pigs with *Br. abortus* is amenable to treatment with sulphanilamide. Under the experimental conditions employed, the curative effect of this drug appeared to be very slight.

In co-operation with SCHWABACHER, experiments on the effect of desensitization on the development of infection in tuberculous g. pigs, indicate that desensitization leads to a striking reduction in the extent and severity of the tuberculous lesions in the tissues, though it is incapable of preventing the ultimate death of the animal.

During a continuation of studies on agglutination and precipitation, DUNCAN carried out a series of experiments to elucidate the problem of the specificity, or non-specificity of the aggregation of antigen-antibody compounds.

WATSON studied the effect of diet on the fertility, survival and growth of mice, and on their resistance to infection. Previous results were confirmed, *viz*, that diets containing a mixture of animal protein, in the form of dried separated milk, and vegetable protein give better survival and growth rates in young mice and confer greater resistance to infection than diets containing vegetable protein alone. The results of a comparison between diets made with dried separated milk obtained from pasture-fed cows and from stall-fed cows showed that " winter " milk is apparently no less effective in increasing the resistance of mice to infection than is " summer " milk. Experiments carried out in collaboration with TOPLEY and JOYCE WILSON confirmed preliminary experiments and showed that the same change in diet that renders individual mice more resistant to *S. typhi-murium*, or to its toxin, significantly reduces the mortality in herds among which the disease is spreading by natural contact.

DIVISION OF BIOCHEMISTRY AND CHEMISTRY AS APPLIED TO HYGIENE.—OXFORD continued work on the monographing of the *Actinomyces* and studied the serological relationship of certain pathogenic strains of anaerobic *Actinomyces*.

CHALLINOR and FREEMAN continued investigation on the isolation of antigens from *S. typhi-murium* and from virulent and non-virulent strains of *S. typhi*.

DEPARTMENT OF CHEMISTRY AS APPLIED TO HYGIENE.—WOOLDRIDGE and HIGGINBOTTOM have shown that the succinic oxidase system of various tissues is strongly inhibited by the bacterial toxins of *Clostridium welchii*, whilst it is unaffected by other toxins of the *Clostridium* group.—R. ALLCROFT.

EXTRACTS FROM MUNICIPAL VETERINARY REPORTS—GREAT BRITAIN

1. BIRMINGHAM. (CITY). (1940). **59th Annual Report of the Chief Veterinary Officer for the Year 1939.** [DEVINE, B.] pp. 27. 1 table. Birmingham: Veterinary & Food Inspection Department. [8vo].
2. CARDIFF. (CITY AND PORT). (1939). **Report on Food Inspection and Diseases of Animals Acts, 1938.** [HUGHES, J. H. M.]—*Rep. publ. Hlth Dep. Cardiff 1938.* pp. 80–97 and 148. Numerous tables.
3. MANCHESTER. (CITY). (1939). **Report of the Markets Committee for the Year ending 31st March, 1939.** [JOHNSTONE, W. K.] pp. 27. Numerous tables, 1 appendix. Manchester: Manchester Corporation, Markets Department. [8vo].
4. MANCHESTER. (CITY). (1939). **Report from Markets Department as to Supervision of Meat and Other Foods, and the Milk Control Section, 1938.**—*Rep. Hlth City Manchr. 1938.* pp. 56–59 and 367–376. Numerous tables.
5. NEWCASTLE UPON TYNE. (CITY AND COUNTY). (1939). **Annual Report of the Veterinary Officer of the City and County of Newcastle upon Tyne, for the year 1938.** [THORNTON, H.] pp. 27. 17 tables. Newcastle upon Tyne: City Veterinary Department. [8vo].
6. PRESTON. (COUNTY BOROUGH). (1939). **Report on Inspection and Supervision of Food, 1938.** [FINCH, R.]—*Rep. med. Offr Hlth Preston, 1938.* pp. 59–77. 3 tables, 1 appendix.
7. SALFORD. (CITY). (1938). **Report Relating to the Meat and Food Inspection, Milk Supply, and the Diseases of Animals Acts, 1937.**—*Rep. med. Offr Hlth Salford, 1937.* pp. 137–146. 3 tables.
8. SALFORD. (CITY). (1939). **Report Relating to the Meat and Food Inspection, Milk Supply, and the Diseases of Animals Acts, 1938.**—*Rep. med. Offr Hlth Salford, 1938.* pp. 145–154.
9. WEST HAM. (COUNTY BOROUGH). (1938). **Report on Inspection and Supervision of Food, and Work under Diseases of Animals Acts, 1937.** [BYWATER, H. E.]—*Rep. Hlth Serv. West Ham, 1937.* pp. 280–312.

ADDITIONAL NOTES.

1. BIRMINGHAM.—Veterinary staff—eight. Report is also given of the Corporation stud of draught horses.
2. CARDIFF.—Veterinary staff—one.
3. MANCHESTER (MARKETS).—Veterinary staff—one. [? four actually.]
4. MANCHESTER (PUBLIC HEALTH).—Veterinary staff—none.
5. NEWCASTLE.—Veterinary staff—one. Statistics of diseased cows found at routine inspections, given for period 1921–1938. Outbreaks of scheduled diseases and beef carcasses condemned, given for same period.
6. PRESTON.—Veterinary staff—one.

7 & 8. SALFORD.—Veterinary staff—none.

9. WEST HAM.—Veterinary staff—two. A record of tuberculous milk samples detected, given for period 1928–1937.

	Milk Supply									Meat Inspection		Notifiable Diseases				
	Number of Herds/Shops Supplying Milk															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Total Numbers	Tuberculin Tested	Accredited	Ungraded	Pasteurized	Milch Cow Census	Samples Tested for TB.	No. Tuberculous	No. of Tuberculous Udders	Tuberculous Bovines	Tuberculous Pigs	Bovine Tuberculosis (including item 9)	Anthrax	Foot and Mouth Disease	Swine Fever	Mange
Birmingham..	47P	1P	14P			830	1,867	173	18	408	210	33		1	26	1
Cardiff ...	35P	1P 60R	12P 6R	135R	25R	280	357	20		88	222					
Manchester(3)										860	130	9			13	
Manchester(4)	51P	1P 47R	10P 21R	958R	26R	1,200	935	103								
Newcastle ...	18P		1P	8P		489	10	3		213	103	4				
Preston ...	19P	8R	3P 34R	252R	2P 4R	466	420	39	92	282	33	144				
Salford (7) ...	400P 777R	14R	7R		23R		584	64					1		11	
Salford (8) ...	250P 767R	15R	3R		25R		374	31							11	
West Ham ...	112P 660R	13R	1P 4R		20R		55	3		11	10	1				

NOTE. P = Producer or Dairyman having a herd of cows inside the municipal boundary.
R = Retailer of milk within the municipality; may include producer-retailers.
Column 6 refers only to cows within the municipality.

GREAT BRITAIN. (1939). **Tenth Annual Report Covering the Period 1st April 1938—31st March 1939 of the Colonial Advisory Committee.** pp. 48. 5 tables. London: H.M. Stat. Off. [8vo] [9d.]

The following schemes for which the committee recommended grants from the Colonial Development Fund during the year are of veterinary interest:—£5,480 for the establishment of a central veterinary research station at Kabete,

Kenya, £4,000 for tick eradication in the Virgin Islands, £34,000 for research on undulant fever in Malta, £3,500 for research on caprine pleuro-pneumonia in Nigeria, £23,201 towards a campaign against contagious bovine pleuro-pneumonia and £3,000 for tsetse fly control in Northern Rhodesia.—J. E.

I. Eire. (1939). **Report of the Veterinary College of Ireland, 1938-39.**—*Rep. Minist. Agric. Eire, 1938–39.* pp. 33–38. 1 table.

II. Eire. (1939). **Work of the Veterinary Research Laboratory, 1938-39.**—*Ibid.* pp. 71–73.

III. Eire. (1939). **Report on Diseases of Animals (Ireland) Acts, 1894-1938 : Dogs' Act, 1906, 1938-39.**—*Ibid.* pp. 121–125 and [48]–[52]. 7 tables.

I. During the year, 230 students attended the college. The results of professional examinations are given ; 13 students qualified for the diploma of M.R.C.V.S.

The work of the Pathology Department has increased to such an extent that it became necessary to divide it into three separate sections, *viz*, General Pathology and Bacteriology, Parasitology, and a Poultry Pathology Section. An analysis is given of the specimens dealt with during the year. 99,514 poultry, 1,193 cattle, 166 horse, 138 dog and cat, 37 pig, and 21 sheep and goat specimens were examined. In the Parasitology Section, 808 specimens were examined.

A total of 9,170 animals, including 1,307 horses, were treated in the college during the year.

II. Diagnosis and Advisory Work.—The details of 4,213 specimens examined are tabulated.

Preparation and Issue of Vaccines.—4,186 doses of anti-abortion vaccine, 22,995 doses of braxy vaccine and 21,277 doses of formolized blackleg vaccine were supplied.

Research Work.—This was confined to work on Contagious Abortion in cattle, the major experiment being the testing of a live, non-pathogenic, thermolabile strain of *Brucella abortus*. Results of the use of this strain in the vaccination of pregnant heifers are described. Experiments on growing *Br. abortus* in such solutions as Locke's and Tyrode's with and without ox serum and with the addition of fresh g. pig placenta were made with positive results. Passage experiments on *Br. abortus* through the g. pig using infected g. pig testicle as the inoculum were started. Experiments showed that cattle may withstand large doses of sulphanilamide *per os* and the drug did not cause any depression of the agglutination titre. Pure and luxuriant cultures of *Br. abortus* were obtained from g. pigs treated with sulphanilamide.

III. The Diseases of Animals Act of 1938, Eire, became law during the year. It empowered the Minister to suspend orders made by him under the Diseases of Animals Acts and gave him additional powers with regard to the control of importation of poultry and eggs.

With the exception of an isolated case of Swine Fever, none of the more serious scheduled diseases occurred, and for the fifth year in succession no case of Anthrax was reported. 217 outbreaks of Sheep Scab, involving 1,844 sheep occurred ; an appreciable reduction from the previous year. 4,366 cases of Bovine Tuberculosis were reported, of which 2,459 were confirmed. Over 400 temporary lay inspectors were again employed by the local authorities in connexion with the Warble Fly orders.

During the year, 178 sheep and 77 cattle were imported from Scotland, and 4 sheep, 3 cattle and 7 pigs from England.—F. T. Boyle.

INDIA. (1939). **Annual Administration Report of the Army Veterinary Service in India for 1938-39.** [DIBBEN, H. C.] pp. 56. Numerous tables. Simla: Govt. India Press. [8vo].

GENERAL.—In addition to routine work, the laboratory is conducting various experiments in the treatment of diseases, such as the efficacy of antimosan in LICHEN TROPICUS [prickly heat], the value of amphotropin in EQUINE ENCEPHALOMYELITIS, and the value of the bilirubin test in the detection of this disease. All this work has been inconclusive.

Some loss of condition was observed among cavalry horses on the North-West Frontier due to a " speed up " in competition with mechanized units. An outbreak of DERMATITIS affecting the coronets and pasterns of mules of a mountain battery was speedily controlled; the origin was obscure. LAMENESS attributed to bone diseases decreased somewhat. Injuries due to kicks remain numerous and are due to a decline in the standard of stable management. A reduction in the number of cases of PYREXIA of unknown origin is attributed to a decrease in the grain ration during hot weather.

SPECIFIC DISEASES.—In the prevention and treatment of STRANGLES, vaccines and sulphamide compounds had no effect. [Doses of the latter were small.] The incidence of ANTHRAX decreased noticeably as a result of a policy of immunization. Only one case of GLANDERS occurred in army animals. The incidence of HAEMORRHAGIC SEPTICAEMIA and FOOT AND MOUTH DISEASE was higher than usual. The value of the mercuric chloride test for the detection of SURRA and of naganol for its treatment is stressed. Acaprin and quinine acid hydrobromide were equally successful against EQUINE PIROPLASMOSIS and neosalvarsan proved markedly beneficial for CONTAGIOUS PNEUMONIA of horses. EQUINE ENCEPHALOMYELITIS increased markedly. The methods of infection and transmission are unknown and no specific curative drug has been found. Notes are given on INFLUENZA in horses. Influenza in camels is also mentioned, but no details are given as to the nature of the illness: neosalvarsan treatment is recommended. A few outbreaks of RINDERPEST occurred in unimmunized cattle.

With reference to horse breeding, the vaginal swab test for pregnancy was found to be 90% accurate and is preferred to Cuboni's chemical test.—R. FISHER.

INDIA. (1939). **The Annual Report of the Director of the Pasteur Institute of Southern India, Coonoor, for the Year ending 31st December 1938 together with The Thirty-Second Annual Report of the Central Committee of the Association, for the Year ending 31st March 1939.** [MULLIGAN, H. W.] pp. 79. 18 tables, 6 appendixes. Coonoor: Pasteur Institute of Southern India. [8vo].

During the year, 40,831 c.c. of 5% carbolized, sheep brain, rabies vaccine were issued for the treatment of animals. Animals treated numbered 561 (478 dogs). During the 16-year period 1923–1938, 4,191 animals received antirabies treatment with a mortality of 2·24%. After the 15th passage through fowls a strain of jackal virus became " fixed "; the duration of the illness in fowls was reduced from four days to one day, and the period of incubation was reduced from 47 days to two days. Symptoms in fowls were salivation, drooping of the head, spasmodic contraction of the neck muscles, and paralysis commencing in the legs and later becoming general. Details are given of the successful propagation of rabbit virus in two different types of tissue culture.—J. A. GRIFFITHS.

HOLLAND. (1939). Verslag van de werkzaamheden der Rijksseruminrichting over 1938. **[Report of the State Serum Institute for 1938].** [LOURENS,

L. F. D. E.] pp. 90. 22 tables. 'S-Gravenhage: Algemeene Landsdrukkerij. [8vo] [Fl. 1].

INTRODUCTION.—The usual figures are given for amounts of biological products issued. A report of work by HOGUE on bovine TRICHOMONADS is given. Tissue cultures inoculated with trichomonads did not survive long, apparently owing to the production of a lethal substance by the trichomonads. This lethal substance was destroyed if the trichomonads were held at a temperature of 60°C. for 20 minutes. The pathogenesis of trichomonad abortion is discussed. H. concludes that a defect in the cervical seal is necessary before the parasites can penetrate into the uterus and cause abortion. Experiments on the chemotherapy of the disease by neutral red and other dyes are being carried out. Work proceeded on the intradermal diagnosis of SWINE FEVER by the method of DONATIEN and LESTOQUARD. It was found that the test was of some value in acute S.F., but of no value in chronic S.F. Outbreaks of acute S.F. are uncommon in Holland. TETANUS anatoxin is now prepared in Holland for use on army horses. A preliminary attempt to immunize ewes against staphylococcal MASTITIS has been made but results are not yet complete. Work on FOWL PARALYSIS to demonstrate the possible prophylactic value of wheat germ gave negative results. An examination of nearly 7,000 fowls showed that the eye changes usually considered characteristic of F.P. are not specific but occur also in various other disease conditions. Among these birds, eye changes were more common between January and June and F.P. between September and December.

SERUM, VACCINE AND DIAGNOSTIC SECTION.—This part of the report is statistical, and deals with biological and diagnostic products made and with examinations of pathological material.

AMBULATORY SECTION.—Here is given an account of many diseases seen in the field. It includes one item of special interest, *viz*, death in a bovine after it had been tuberculin tested intradermally. Death was due to pulmonary oedema and there were no gross tuberculous lesions.

IMMUNOLOGICAL DIAGNOSIS.—3,400 blood samples were tested for BRUCELLOSIS and 1,465 were positive, 74 doubtful and 1,870 negative. All of seven blood samples were negative for GLANDERS. Of over 32,000 avian blood samples, 1·7% were positive for PULLORUM DISEASE. Of 2,237 samples of intestinal mucus, 19% were positive for JOHNE'S DISEASE. The geographical incidence of the latter in Holland is given in a table. Johnin tests were carried out on 390 cattle in nine herds. The average percentage of infection was 6·6. In tests with different lots of johnin it appeared that johnin prepared from a culture which had grown slowly, contained a substance which caused nonspecific reactions. Samples from relatively young cultures were found to be fairly reliable under test. Under Dutch conditions it is suggested that a two-fold increase in the skin thickness plus 2 mm. or more should be regarded as a positive result. No case of RABIES was diagnosed during the year.

Figures are also given concerning bacteriological examination of milk samples, and analysis of foodstuffs and of proprietary medicines.—J. E.

ANGOLA. (1937). Alguns elementos estatísticos da actividade dos serviços de veterinária e pecuária. **[Statistical Report of Veterinary Work, 1931-1935]**. [AIRES, A. A.]—*An. Serv. vet. Pec. Angola, 1936*. pp. 175–206. 2 charts.

This is a report mainly of measures in preventive medicine taken by the veterinary service of the colony. During the five years under consideration a total of 366,901 vaccinations was made, increasing from 43,532 in 1931 to 136,041 in 1933. There was a decrease in 1934 to 64,205, but the total rose again in 1935 to 85,847. The greater part of these vaccinations was concerned with BOVINE CONTAGIOUS PLEURO-PNEUMONIA, a total of 199,438 being made in the five years.

Next in importance was ANTHRAX with a total of 118,411 vaccinations, and then BLACKLEG with 48,377. 225 vaccinations were carried out against SWINE PLAGUE and SWINE ERYSIPELAS in the five-year period. A smaller number of vaccinations was made against RABIES and FOWL CHOLERA.

The State dipping baths dealt with a steadily increasing number of animals during the five years. In 1931, 99,494 animals were dipped, and in 1935 the number had risen to 179,767 animals. The total over the five-year period was 645,142, including cattle, horses and mules, and small animals.

The number of castrations carried out increased.

An account is given of the number of animals on the State stock farms.

—MILLER WATSON.

INDO-CHINA. (1938). Fonctionnement des Services des Instituts Pasteur d'Indo-chine en 1937. [**Report of the Pasteur Institutes in Indo-China for 1937**]. —*Arch. Inst. Pasteur Indo-Chine.* **7.** 319–337.

The duties of the Institutes are detailed. They comprise educational and supervisory as well as executive work.

Anti-rabic vaccine is made at Hanoi for human beings and at Nhatrang for animals. 7,915 doses of 10 c.c. of vaccine for animals were issued. Reduction of the number of ownerless dogs and vaccination of owned dogs constitute the most effective methods of prevention.

A special effort was made to control the diseases of swine because of the increased value of these animals.

It is claimed that the Veterinary Pasteur Institute of Indo-China at Nhatrang exerts an increasing scientific influence over all the far East. A list of biological products issued by it is given.—G. WILLIAMSON.

UNITED STATES OF AMERICA: CONNECTICUT. (1938). **Biennial Report of the Commissioner on Domestic Animals for the Period Ended June 30, 1938.** [DIMOCK, E. R.] pp. 24. Hartford, Connecticut: Commissioner on Domestic Animals. [8vo].

A short history of bovine TUBERCULOSIS eradication in Connecticut is given. Tuberculin testing was begun in 1894, and in 1896, 14% of 6,304 cattle reacted. Between 1921 and 1929 the bulk of the testing work under the federal eradication plan was carried out [no results given] and in the two-year period under review a reaction figure of less than 0·5% was obtained in tests on some 400,000 cattle.

Bovine BRUCELLOSIS control is at present being carried out under three different plans—federal, state, and private, the two former being cost-free to herd owners. Initial herd tests show that one-half of the herds and about one-quarter of the cows in the herds are infected. There are 136 accredited herds, 170 clean herds, and 60 herds which were rid of infection by the removal of reactors during the biennium.

In 1936, the state authorities began work on the control of MASTITIS and a special field staff was trained. A preliminary voluntary bromthymol blue test was carried out on cows in 6,028 herds. Over half of all herds contained one or more cows giving abnormal milk, and 22·5% of all cows gave abnormal milk. At a second test the latter figure fell to 20%.

A bad outbreak of RABIES in dogs occurred in 1937. The usual restraint, killing of stray dogs, and vaccination measures, were applied, but the disease was not eradicated; just over 40 rabid dogs were observed in each of the two years.

POULTRY DISEASE control has been energetically practised in Connecticut since 1925, and there were 272 flocks free from PULLORUM DISEASE in 1938. Avian LARYNGOTRACHEITIS is controlled by quarantine and vaccination.

Notes are also given on other diseases, on meat inspection and on inter-state movements of livestock.—J. E.

BOOK REVIEWS

TERROINE, É. F. [Professeur à l'Université de Strasbourg, Directeur de l'Institut Physiologie générale de la Faculté des Sciences]. (1939). Le metabolisme de l'azote. III. Physiologie des substances protéiques. II.—Dégradation, synthèse, métabolisme intermédiaire. Fascicule 2. Le catabolisme protidique. Les traits communs du catabolisme des acides aminés : uréogénèse et uricogénèse, formation de substances ternaires, combustion. [**Nitrogen Metabolism. III. The Physiology of Protein Substances. Part 2. Degradation Synthesis and Intermediary Metabolism. Section II. Protein Catabolism. The Common Characteristics of the Catabolism of Amino-Acids; Combustion and Formation of Ternary Substances of Urea and Uric Acid**]. pp. 165–410. 10 tables. [Numerous refs.] Paris : Presses Universitaires de France. [8vo] [Fr. 60].

This monograph, one of a series dealing with the metabolism of N, is concerned more specifically with questions of catabolism of amino-acids and the production of urea and uric acid. The work covers over 700 references and is divided broadly into two sections. In the first is considered the transformation of amino-N into the various excretory products found in warm- and cold-blooded animals. Consideration is given to the significance of urinary NH_3, and to uric acid production.

The second section is concerned with the fate of the amino-acid chain after the N has been split off. Amongst the products of the cleavage are glucose, glycogen and fats, the formation of each of which is dealt with in turn. Those amino-acids giving rise to glucose or glycogen and the physiology of this glycogenesis are then considered, and finally the metabolism of the non-glucose forming amino-acid residues is discussed.

The work has been enriched by many of the author's own personal observations and it is obvious that the review has been carefully undertaken and the field of the relevant literature adequately covered.—ALFRED EDEN.

DAHLBERG, G. [M.D., LL.D., Professor at the University of Uppsala, Head of the Swedish State Institute for Human Genetics and Race Biology]. (1940). **Statistical Methods for Medical and Biological Students.** pp. 232. 13 figs., 26 tables, 2 appendixes. London : George Allen & Unwin Ltd. [8vo] [10s. 6d.]

This short book, like that by BRADFORD HILL reviewed earlier [*V. B.* **8.** 184.], is only intended as an introduction of statistical methods, and aims at presenting the material in a form requiring no knowledge of mathematics beyond that supplied by school education, but at the same time giving some idea of the mathematical concepts upon which the methods are based. When an elementary exposition of the method of arriving at formulae is not convenient an attempt is made to suggest the line of reasoning in words. In illustrating the applicability of formulae, examples are taken from medical problems such as analysis of differences between first- and second-born twins, frequency of complications in diseases occurring in hospital patients, and frequency of accidents in factories in relation to management.

The first few chapters deal in general terms with probability, combinations, permutations and the binomial theorem. Subsequent chapters deal with statistical characterizations of material, quantitative and qualitative statistics, standard error, addition of groups of factors, variability, significant differences, defects of materials, measures of asymmetry and dissymmetry, co-variation and correlation coefficients, and similar statistical concepts. Four of the commoner tables used in statistical calculations are supplied in an appendix.—H. H. GREEN.

AUTHOR INDEX, 1940

A

Aaser, C. S., 870.
Abdalla, N. W., & McLeod, J. W., 817.
Abelein, R., 167.
Abrams, E. See Otto, G. F., jt. author, 686.
Abusalimov, N. S. See Markov, A. A., et al., jt. authors, 919.
Accousti, N. J. See Landsberg, J. W., jt. author, 795.
Acharya, S. K., 709.
Ackert, J. E., 767.
—, Edgar, S. A., & Frick, L. P., 431.
—, Whitlock, J. H., & Freeman, A. E., Jr., 683.
—. See also Reid, W. M., et al., jt. authors, 32.
Adam, R. See Troup, A. G., et al., jt. authors, 426.
Adey, C. W., & Kennedy, M., 747.
Adler, S., Theodor, O., & Witenberg, G., 917.
Adriano, P. See Altara, I., jt. author, 720.
Agriculture, essays on: *Festschrift* to Sir Daniel Hall, 406.
Alkashev, D. E., & Dubovik, N. M., 711.
Alkashev, D. N. See Muratov, E. A., jt. author, 581.
A. R. P. Handbook, No. 12, 634.
A.R.P. Nat. anim. Comm.: Wartime Aids, 634.
Aires, A. A., 980.
—, & Lima do Sacramento Pratas, A., 971.
Albania. Rep. vet. Serv., 1928-38, 569.
Albiston, H. E., 81.
Albornoz, J. E., 189.
Albrecht, A., 490.
Aldred, P., 882.
Alegren, A. See Carlström, B., jt. author, 853.
Alexander, R. A., 89.
—. See also Mason, J. H., jt. author, 503.
—. See also du Toit, P. J., jt. author, 441.
Alföldy, J. See Országh, O., jt. author, 601.
Alicata, J. E., 34.
—, & Chang, E., 99.
Alikaev, V. A. See Orlov, N. P., et al., jt. authors, 768.
Alkan, W. J. See Kleeberg, J., et al., jt. authors, 462.
Allcroft, W. M., & Green, H. H., 695.
Allen, A. C., 111.
Allen, N. N., 144.
Allen, R. M. See Siegel, L., et al., jt. authors, 457.
Almasy, F. See Krupski, A., et al., jt. authors, 542, 862, 863.
Almquist, H. J., & Klose, A. A., 122, 458, *bis*.
—. See also Klose, A. A., et al., jt. authors, 122.
Altara, I., & Adriano, P., 720.
Ambrosioni, P., 842.
Amer. Rev. Tuberc., 687.
Amies, C. R., & Carr, J. G., 609.
—, —, & Purdy, W. J., 280.
Ammann, K., 533, 971.
Amoroso, E. C., Griffiths, W. F. B., & Hamilton, W. J., 392.
Andersen, M., 923.
Andersen, S., 666.
Anderson, A. K. See Kennedy, W. L., et al., jt. authors, 133.
Anderson, C., & Disdier, C., 185.
Anderson, E. O. See Plastridge, W. N., et al., jt. authors, 231.
Anderson, G. W., 739.
——. See also Wise, G. H., jt. author, 384.
Anderson, J., 215.
Anderson, O. D., 111.
Anderson, R. J., & Creighton, M. M., 75.
—, —, & Peck, R. L., 822.
—. See also Salisbury, L. F., jt. author, 263.
Andersson, N., 690.
Andervont, H. B., 193, 539.
Andrewes, C. H., 280.
—, & Glover, R. E., 364.
—, & Smith, W., 173.
Andrews, J. S., 33, 266.
Andrievskiĭ, I., 671.
Angeloff, 316.
Angola. An. Serv. vet. Pec. 1939, 980.
Antigua. Rep. vet. Offr, 1938, 643.
Antipin, D. N., 795.
Antoine, C. See Richet, C., jt. author, 749.
Antunes Tropa, E., & Pégo, F., 346.
Apollosova, P. A., 442, 689.
—. See also Dukalov, A. I., et al., jt. authors, 658.
Aranicki, M., 421.
Arboleda, C. A. C., 962.
Archer, W. See Fritz, J. C., et al., jt. authors, 287.
Archibald, R. M., & Hancock, E. E. I., 284.
Arch. Inst. Pasteur Algér., 308, *bis*.
Arch. Inst. Pasteur Indo-Chine, 981.
Arch. Inst. Pasteur Tunis, 309.
Arkhangel'skiĭ, N. D. See Laktionov, A. M., et al., jt. authors, 671.
Arnold, A., & Elvehjem, C. A., 114, 286.
Arrowsmith, W. R. See Moore, C. V., et al., jt. authors, 696, *bis*.
Aschaffenburg, R. See Kay, H. D., et al., jt. authors, 869.
Aschmoneit, E., 109.
Asher, T. See Trautmann, A., jt. author, 213.
Assèmat, A., 857.
Astwood, E. B., & Greep, R. O., 390, *bis*.
Ataĭ, A., 831.
Atkeson, F. W. See Whitnah, C. H., et al., jt. authors, 785.
Atkins, W. R. G., 43.
Aubel, C. E., & Hughes, J. S., 541.
Aubertin, E., & Perrineau, G., 320.
Auburtin, P. See Laigret, J., jt. author, 630.
Augustine, D. L., 350.
—, & Davey, D. G., 100.
Australia. Live Stock Dis. Rep., New South Wales, 1937-38, 637.
—. Rep. Dep. Agric. Qd, 1936-37, 150.
—. Rep. Dep. Agric., Qd, 1937-38, 567, 568, 638.
Axelrod, A. E., Madden, R. J., & Elvehjem, C. A., 456.
Aygün, S. T., & Baskaya, H., 181.
Ayyar, D. H. See Nair, K. S., et al., jt. authors, 670.

B

Baars, G., 55.
Baatz, H., 281, 363.
Bablet, J., 477.
Bacharach, A. L., 787.
—. See also Drummond, J. C., et al., jt. authors, 700.
—. See also Macfie, J. M., et al., jt. authors, 787.
Badami, B. K., 219.
Bader, R. See Habs, H., jt. author, 957.
Baer, J.-G. See Joyeux, C., jt. author, 99, 181, 347.
Bāsu, U. P. See De, S. P., jt. author, 56.
Basutoland. Rep. Dep. Agric., 1937-38, 724.
Bagchi, K. N., & Ganguli, H. D., 382.
Baggenstoss, A. H. See Feldman, W. H., jt. author, 492.
Bahr, L., 54.
Bailly, J. See Remlinger, P., jt. author, 424, 514, *bis*, 673, *bis*, 841, 928, *bis*.
Bak, A. See Zagrodzki, K., et al., jt. authors, 39.
Baker, F. C. See Robinson, W., jt. author, 28.
Bakker, T. See Picard, F. H. J., jt. author, 613.
Bald, J. G. See Dickson, B. T., et al., jt. authors, 755.
Bale, W. F. See Hahn, P. F., et al., jt. authors, 696, 798, *bis*.
Ball, V. See Martin, J. F., et al., jt. authors, 860.
Balozet, L., 262, *bis*, 588.
—, & Callot, J., 261, *bis*.
Balykin, M. T. See Gusev, V. F., et al., jt. authors, 917.
Bandemer, S. L., Davidson, J. A., & Schaible, P. J., 709.
Banting, F. G., 45.
Baranov, N., 259, 590, 765.
Barber, C. See Pop, A., et al., jt. authors, 241.
Barbosa, S., 146.
Barbour, G. M. See Carpenter, C. M., jt. author, 125.
Barcroft, J., Barron, D. H., Cowie, A. T., & Forsham, P. H., 626.
—, Kennedy, J. A., & Mason, M. F., 626.
Bardelli, F., & Menzani, C., 916.
Bardelli, P., 225.
Bárdosi, Z., 624.
Barer, A. P. See Fowler, W. M., jt. author, 696.
Barker, D. See Fritz, J. C., et al., jt. author, 287.
Barker, J. F. See Behrens, C. A., et al., jt. authors, 515.
Barker, J. R., 46.
Barker, S. B., 540.
Barkworth, H., & Irwin, J. O., 52.
Barnes, M. F., 739.
Barnes, R., 306.
Barnes, W. A. See Furth, O. B., et al., jt. authors, 859.
Barnett, L., 183.
Barr, C. G., Reuszer, H. W., & Thorp, F., Jr., 624.
Barratt, E., 177.

Barrett, R. E. See Hawking, F., et al., jt. authors, 56.
Barrie, M. M. O. See Drummond, J. C., et al., jt. authors, 700.
Barron, D. H. See Barcroft, J., et al., jt. authors, 626.
Barron, N. S., 819.
—, Davis, J. G., & McClemont, J., 440.
Bartel, 53.
Bartel, H., 550, *bis*.
Bartels, 258.
Bartels, D., 257, *bis*.
Bartlett, A., Cotton, A. G., Mackintosh, J., Crichton, J. A., & Biggar, W. A., 283.
Bartlett, K. A., 843.
Baskaya, H. See Aygün, S. T., jt. author, 181.
Bass, C. C., 827.
Baudet, E. A. R. F., 659, *bis*, 846.
Bauer, H., 326.
—, & Rosenthal, S. M., 552.
Bauer, J. T., 563.
Bauernfeind, J. C. See Norris, L. C., jt. author, 613.
Baumann, C. A., & Rusch, H. P., 281.
Baumann, E. J., & Sprinson, D. B., 119.
Baumann, R., 248.
Baumann, T., 576.
Bawa, H. S., 934.
—, & Haji, C. S. G., 510.
Bayron, M. See Saleun, G., et al., jt. authors, 584.
Bayrou, M. See Malbrant, R., et al., jt. authors, 915.
Bazeley, P. L., Jakobowicz, R., & Splatt, B., 791.
Beach, B. A., 81.
—. See also Hastings, E. G., jt. author, 230.
Beach, J. R., & Twisselmann, N. M., 364.
Beard, J. W., Finkelstein, H., & Wyckoff, R. W. G., 589.
—. See also Sprunt, D. H., et al., jt. authors, 589.
Bearse, G. E., Miller, V. L., & McClary, C. F., 785.
Bearup, A. J. See Heydon, G. A. M., jt. author, 100.
Beath, O. A., Eppson, H. F., Gilbert, C. S., & Bradley, W. B., 796.
—. See Bradley, W. B., et al., jt. authors, 131, *bis*.
Beattie, C. P., Beattie, M. H., & al Zahawi, S., 412.
Beattie, M., 891.
Beattie, M. H. See Beattie, C. P., et al., jt. authors, 412.
Beaudette, F. R., 124.
—, & Hudson, C. B., 339.
—. See also Metzger, H. J., et al., jt. authors, 630.
Beaumont, E., 416.
Bechdel, S. I., Hilston, N. W., Guerrant, N. B., & Dutcher, R. A., 51.
—. See also Flora, C. C., et al., jt. authors, 614.
—. See also Kennedy, W. L., et al., jt. authors, 133.
—. See also Ward, R. E., et al., jt. authors, 544.
Beck, C., 648.
Becka, J., 367.
Becker, 54.
Becker, E. R., & Waters, P. C., 918.
Becker, M. See Lenkeit, W., jt. author, 195.
Beckett, F., 911.
Beckh, A., 960.
Beckwith, T. D. See Morgan, H. R., jt. author, 11.
Bedson, S. P., 272, 677.
—. See also Troup, A. G., et al., jt. authors, 426.
Behrens, C. A., Schweider, L. B., Barker, J. F., & Reeves, J. L., 515.
Behrens, E., 209.
Beiejrs, J. A., 161.
Bekker, P. M. See Steyn, D. G., jt. author, 130.
Belding, D. L., & Marston, A. T., 483.
Belfort, J. See Decourt, P., et al., jt. authors, 126.
Belin, 509.
Belle, G., 377.
Belschner, H. G., 539, 637, 776.
Belt, T. J., 275.
von Benedek, L., 513.
Benedict, F. G., 156.
—. See also Ritzman, E. G., jt. author, 729.
Benetato, G., & Ciurdariu, P., 468.
Bengtson, I., 659.
Benhamon, E., 831.
Benkő, S., 798.
Bennett, H. S., 563.
Bennett, S. C. J., 400.
—. See also Hoare, C. A., jt. author, 244.
Bennetts, H. W., & Hall, H. T. B., 854.
Bequignon, R. See Boquet, A., jt. author, 235.
—. See also Levaditi, C., et al., jt. authors, 589, 676.
Ber, A., 240.
Berger, H. C. L. E., 570.
van den Berghe, L., & d'Ursel, F., 341, *bis*.
Berkson, J., Magath, T. B., & Hurn, M., 970.
Bernadskaya, Z. M., 680.
—. See also Bogoroditskiĭ, A. V., jt. author, 344.
—. See also Bogoroditskiĭ, A. V., et al., jt. authors, 620.
Bernal, J. D., 572.
Bernát, J., 625.
Bero, D. See Hassall, A., et al., jt. authors, 807.
Berry, G. P. See Syverton, J. T., jt. author, 758.
Berry, J. L., 695.
Berthaud. See Malterre, et al., jt. authors, 563.
Berthelon, M., & Brivois, P., 55.
—, & Goret, P., 589.
Bertho, A., & Grassmann, W., 310.
Bertrand, G., 196.
Bertrand, I., Blanchard, & Salles, P., 450.
Besley, A. K. See Gamble, J., et al., jt. authors, 140.
Besredka, A., & Salamon, E., 969.
Bessemans, A., Janssens, P., & van Meirhaeghe, A., 749.
Best, C. H., 621.
—, & Solandt, D. Y., 692.
Best, R. J., 665.
—. See also Dickson, B. T., et al., jt. authors, 755.
Bethke, R. M. See Hunt, C. H., et al., jt. authors, 201.
de Bettencourt, A., 515.
Bevan, L. E. W., 959.
Bhattacharjee, J., 932.
Bicknall, F., 458.
Bierbrauer, M., 495.
Biester, H. E., & Eveleth, D. F., 195.
—, & Schwarte, L. H., 162.
—, —, & Eveleth, D. F., 44.
—. See also Schwarte, L. H., et al., jt. authors, 623.
Biggar, W. A. See Bartlett, A., et al., jt. authors, 283.
Bigger, J. W., 154.
—, Blacklock, J. W. S., & Parish, H. J., 804, 886.
Bilal, 616.
Bilal, S., 591.
—. See also Kamil, S., jt. author, 162.
Bindemann, H. C., 889.
Binkley, S. B. See Doisy, E. A., et al., jt. authors, 547.
—. See also MacCorquordale, D. W., et al., jt. authors, 458.
Biocca, E., 500.
Birago, D., 249.
Birch, R. R., 740, 745.
Birch-Hirschfeld, L., 231.
Bird, H. R., Oleson, J. J., Elvehjem, C. A., Hart, E. B., & Halpin, J. G., 955.
Birkhaug, K., 375, 599.
Birkhaug, K. E., 652.
Bischoff, F., & Long, M. L., 200.
Bischoff, O., & Haun, F., 710.
Bishop, A., Tate, P., & Thorpe, M. V., 247.
Bishop, L. M. See Fitch, C. P., jt. author, 290.
—. See also Fitch, C. P., et al., jt. authors, 14, 30.
Bishopp, F. C., & Smith, C. N., 260, 428.
Bisschop, J. H. R., 475.
Bittner, J. J., 860.
Black, D. A. K., Powell, J., & Witts, L. J., 796.
Blacklock, J. W. S. See Bigger, J. W., et al., jt. authors, 804, 886.
Blahd, M., Frank, I., & Saphir, O., 46.
Blair, J. E., 4.
Blakemore, F., 40, 777.
—, & Dalling, T., 782.
Blanchard. See Bertrand, I., et al., jt. authors, 450.
Blanchard, L., Poisson, J., & Drieux, H., 363.
Bland, J. O. W., & Robinow, C. F., 339.
Blatt, M. L., Zeldes, M., & Stein, A. F., 841.
Blattner, R. J. See Cooke, J. V., jt. author, 884.
Bloch, F. See Stamatin, N., jt. author, 73.
—. See also Rist, N., et al., jt. authors, 375, 909.
Blood, F. R. See Hueper, W. C., et al., jt. authors, 451.
Blood, symposium on, 406.
Blount, W. P., 35, 370, 377, 625.
Blumberg, H., Shelling, D. H., & Jackson, D. A., 285.
Blumer, C. C., Madden, F. J., & Walker, D. J., 119.
Bobkoff, G. See Gavrilov, W., et al., jt. authors, 247.
Bobkó, B., 93.
Bocage, A. See Ramon, G., et al., jt. authors, 38.
Bock, E., & Oesterlin, M., 717.
von Bockelburg, U. See Hailer, E., et al., jt. authors, 317.
Boddie, G. F., 617.
Bøe, J. Hartmann, O., & Thjøtta, T., 498.
Boer, H. D., 8.
Boev, S. N., 685.
Bogoroditskiĭ, A. V., 332.
—, & Bernadskaya, Z. M., 344.
—, —, & Lavrent'ev, P. A., 620.
—, & Lavrent'ev, P. A., 620.
Bogue, J. Y., 386.
Bohstedt, G. See Phillips, P. H., et al., jt. authors, 869.

Boivin, A., & Mesrobeanu, L., 39.
—. See also Ramon, G., et al., jt. authors, 38.
Boko, F., 379.
Bol. pec., Lisboa, 7, 233.
Bol. mens. Direcc. Ganad., Montevideo, 29, 35.
Bolle, W., 252.
Bollman, J. L. See Flock, E. V., et al., jt. authors, 629.
—. See also McDonald, J. R., et al., jt. authors, 450.
—. See also Schlotthauer, C. F., et al., jt. authors, 859.
Bondi, A. See Kolmer, J. A., et al., jt. authors, 657.
Bonét-Maury, P., & Olivier, H. R., 909.
Bongert, J. G., 6.
Bonne, C., 362.
Bonnefoi, A. See Mollaret, P., jt. author, 664.
Bonner, W. G., McNaught, K. J., & Paul, G. W., 197.
Bonnet, H., Thieffry, S., & Montefiore, 101, *bis*.
Boquet, A., 235, 787.
—, & Bequignon, R., 235.
—, & Lenci, E., 821.
—, & Stamatin, N., 72.
Bordet, J., 484.
Bordet, P., 16.
Borowka, W., 550.
Bory, L., 483.
Bos, A. See Nieschulz, O., jt. author, 248.
—. See also Nieschulz, O., et al., jt. authors, 329.
Boscq, H. See Guibert, J., jt. author, 829.
Bosworth, T. J. See Buxton, J. B., et al., jt. authors, 736.
Bottomley, A. C., Folley, S. J., & Walker, F. H. A., 464.
—, —, —, & Watson, H. M. S., 464.
Boughton, D. C., 751.
Boughton, I. B., & Hardy, W. T., 132.
Boughton, R. V., 345.
Boursnell, J. C., Dangerfield, W. G., & Wormall, A., 211.
—, & Wormall, A., 554.
Boutrois, M. See Velu, H., jt. author, 383.
Bovarnick, M. See MacDowell, E. C., et al., jt. authors, 950.
Bovet, D. See Brumpt, E., et al., jt. authors, 960.
Bower, J. O., Burns, J. C., & Mengle, H. A., 56.
Bowness, E. R., 285.
Boyarshinov, P. K., 733.
Boyd, W. C., & Hooker, S. B., 433.
Boyd, W. L. See Fitch, C. P., et al., jt. authors, 14, 80.
Boynton, W. H., & Woods, G. M., 833.
Bozicevich, J., & Detre, L., 850.
Brachetka, J. See Jansch, H., jt. author, 296.
Bradfield, E. W. C., 633.
Bradley, W. B., Beath, O. A., & Eppson, H. F., 131.
—, Eppson, H. F., & Beath, O. A., 131.
—. See also Beath, O. A., et al., jt. authors, 796.
Bradley, W. H., 407.
Braga, A., 279.
Brand, E., Cahill, G. F., & Kassell, B., 948.
van den Branden, 329.
van den Branden, F., 166, 959.
Brandly, C. A., 930.
—, & Dunlap, G. L., 177, 930.
Bradley, C. A. See also Levine, N. D., jt. author, 168.
Brandstetter, S., 78.
Brandt, A., 837.
Brandt, O., & Hülphers, G., 702.
Branlon, H. D., Stackhouse, J. E., & Hull, H., 199.
—. See also LeMasurier, H. E., jt. author, 384.
Brayton, N. L. See Turner, T. B., jt. author, 631.
Breitenstein, 947.
Brennan, J. M., 97.
Brewer, G., 709.
Bridré, J., & Krassnoff, D., 255.
—, & Martin, L. A., 926.
Briese, R. R., & Couch, J. F., 558.
Briggs, F. A. See Hueper, W. C., et al., jt. authors, 451.
Brinkhous, K. M., Smith, H. P., Warner, E. D., & Seegars, W. H., 135.
—. See also Knowlton, G. C., et al., jt. authors, 288, 787.
Brion, A., 83.
Briskas, S. See Polonovski, M., jt. author, 196, *bis*.
British Honduras. Rep. Dep. Agric., 1938, 308.
Brit. med. J., 60, 236, 243, 283, 294, 371, 375, 380, 446, 536, *bis*, 545, 552, 559, 698, 705, 787, 871, 886.
British Somaliland. Rep. vet. agric. Dep., 1938, 477.
Brit. Stand. Inst., 556.
Britton, J. W., 349, 597.
Brivois, P. See Berthelon, M., jt. author, 55.
Broadhurst, J., Cameron, G., & MacLean, M. E., 516.
Brock, J., & Hunter, D., 696.
Brock, J. F., 696.
Brody, A. L., 97.
Broicher, C. See Klein, W., jt. author, 386.
Bronkhorst, J. J., 449.
Brooke, W. S. See Wells, A. Q., jt. author, 737.
Brooks, P. B., 617.
Broom, J. C., & Brown, H. C., 413.
—. See also Brown, H. C., jt. author, 356.
Brothwood, W. C. V. See Trimble, C. J., jt. author, 291.
Brouwer, E., Frens, A. M., Reitsma, P., & Kalisvaart, C., 369.
Brower, A. B. See Furth, O. B., et al., jt. authors, 859.
Brown, E. W. See Nelson, W. E., et al., jt. authors, 354.
Brown, G. L., & Harvey, A. M., 276, 612.
Brown, H. C., 939.
——, & Broom, J. C., 356.
—. See also Broom, J. C., jt. author, 413.
Brown, H. W., 101.
—, & Sheldon, A. J., 686.
Brown, T. M. See Swift, H. F., jt. author, 582.
Browne, F. J. See Drummond, J. C., et al., jt. authors, 700.
Browne, J. S. L. See Karady, S., jt. author, 446.
Browning, C. H., 293.
Brownlee, A., 442.
—. See also Linton, R. G., jt. author, 544.
Brownlee, I. F. See Osgood, E. E., jt. author, 705.
Bruce, W. G., 29, 96.
Bruckner, J. H. See Hutt, F. B., et al., jt. authors, 773.
Brumpt, E., Bovet, D., & Brumpt, L., 960.
Brumpt, L. See Brumpt, E., et al., jt. authors, 960.
Bruner, D. W., Dimmock, W. W., & Edwards, P. R., 238.
—, & Edwards, P. R., 324.
Brutsaert, P., & Henrard, C., 245.
Bryan, C. S., 616, 788.
Bryan, W. L. See Mason, K. E., jt. author, 786.
Buchanan, K. S. See Sure, B., et al., jt. authors, 369.
Buck, & Metzger, 752.
Buck, G., 752.
—. See also Verge, J., et al., jt. authors, 110.
Buck, J. M. See Cotton, W. E., et al., jt. authors, 912.
Buck, S. C. See May, H. B., jt. author, 790.
Buckley, J. J. C., 32.
Buckley, S. S. See McPhee, H. C., jt. author, 779.
Bülbring, E., 62.
Buenò, P., 947.
Buer, A. W., 534.
Bürgers, J., 704.
Bull, L. B., 497.
—, Marston, H. R., Murnane, D., & Lines, E. W. L., 115.
Bullard, J. F., 278.
Bull. agric. Congo belge, 805.
Bull. Hlth. Org. L. o. N., 63, 402, 659, *bis*, 699, 720, 939.
Bull. Off. internat. Epiz., 225, 233, 506, 565, *bis*, 575, 669, 896, 897.
Bull. Soc. vét. prat. Fr., 586.
Bull. Uzbek. nauchn.-issled. vet. Inst., Tashkent, 727.
Bullier, P. See Urbain, A., et al., jt. authors, 22.
Bunyea, H. See Shook, W. B., jt. author, 10.
—. See also Couch, J. F., jt. author, 465.
Burckhardt. See Hailer, E., et al., jt. authors, 317.
Burma. Rep. civ. vet. Dep., 1936-37, 639.
Burn, C. G. See Liebow, A. A., et al., jt. authors, 786.
Burnet, E., 302.
Burnet, F. M., 516.
—, & Freeman, M., 834.
—, —, Jackson, A. V., & Lush, D., 771.
—, Lush, D., & Jackson, A. V., 674, *bis*.
—, & Williams, S. W., 674.
—. See also Dickson, B. T., et al., jt. authors, 755.
Burns, J. C. See Bower, J. O., et al., jt. authors, 56.
Burns, M. V. See Harvey, H. I., et al., jt. authors, 867.
Burschkies, K. See Rothermundt, M., jt. author, 792.
Bushland, R. C., 463.
—. See also Melvin, R., jt. author, 343.
Bushnell, L. D., Frick, E. J., & Twiehaus, M. J., 646.
—, & Twiehaus, M. J., 773.
Butt, H. R. See Clark, R. L., et al., jt. authors, 289.
Buttle, G. A. H., 293.
Buxton, J. B., & Glover, R. E., 322.
—, —, Dalling, T., & Bosworth, T. J., 736.
Buzenac, J., 316.
Buzna, D., 238.
Bywater, H. E., 975.

C

Cabasso, V., Schaefer, W., & Harpøth, H., 908.

Cabot, D. A. E., 632.
—. See also Henry, M., et al., jt. authors, 278.
Caccavella. See van Saceghem, R., jt. author, 420.
Cahill, G. F. See Brand, E., et al., jt. authors, 948.
Cailleau, R., 168.
Calder, R. M., 938.
Callot, J. See Balozet, L., jt. author, 261, *bis*.
Calzada, V., 32, 179.
—. See also Pou, M. C., et al., jt. authors, 415, 686.
Cambau, 355.
Cambel, P., 347.
Cameron, A. E., 260, 305.
Cameron, G. See Broadhurst, J., et al., jt. authors, 516.
Cameron, H. C. See Dodds, G. S., jt. author, 542.
Cameron, H. S., & McOmie, W. A., 938.
—, & Stewart, M. A., 685.
Cameron, T. W. M., 180, 729.
Campbell, D. H., 263.
Canada. Rep. Ont. Res. Fdn, 1938, 307.
—. Rep. vet. Dis. Gen. Dep. Agric., 1937-38, 305, *bis*, 306, *bis*.
Candler, A. C., 311.
Canić, R. See Fleischhauer, G., jt. author, 599.
Canić, R. J., 184.
Cannon, C. Y. See Underbjerg, G. K. L., et al., jt. authors, 546.
Cantarow, A., & Haury, V. G., 215.
—, Stewart, H. L., & Morgan, D. R., 376.
—. See also Stewart, H. L., jt. author, 376.
Caporale, G., 651.
Capelle. See Descazeaux, J., jt. author, 848.
Card, L. E. See Roberts, E., et al., jt. authors, 739.
Cardassis, J., 954.
Cardoso, D. M., Nobrega, P., & Reis, J., 874.
Carleton, H. M., & Leach, E. H., 630.
Carlinfanti, E., 170.
Carlström, B., & Alegren, A., 853.
—, & Hjärre, A., 25.
Carmichael, J., 401, 408, *bis*, 649.
—, & Jones, E. R., 718.
Carne, H. R., 76.
Carneiro, V., 840.
Carpenter, C. D., & Martin, J. H., 112.
Carpenter, C. M., & Barbour, G. M., 125.
Carpentier, 308.
Carpentier, G., 485.
Carr, J. G. See Amies, C. R., jt. author, 609.
—. See also Amies, C. R., et al., jt. authors, 280.
Carson, G. B. See Hassall, A., et al., jt. authors, 807.
Carta, A., 99, 360.
Carter, H. B., 886.
Carvalho, A., & Vidal, C., 74.
Carver, J. S., Heiman, V., & Cook, J. W., 121.
Case, A. A. See Reid, W. M., et al., jt. authors, 32.
Casey, A. E., 537.
—, & Pearson, B., 537.
—. See also Pearson, B., jt. author, 537.
Cashell, G. T. W., & Kon, S. K., 955.
Castellani, A., 166.
Castle, W. E., 902, *bis*.
Cauchemez, Nain, & Prudhomme, 847.
Caughley, F. G. See White, P., jt. author, 948.
Cave, H. W. See Whitnah, C. H., et al., jt. authors, 785.
Cawston, F. G., 262, *bis*.
Ceccaldi, J. See Lwoff, M., jt. author, 329.
Cernovsky, J., 922.
Césari, E., 372.
Ceylon. Rep. Govt vet. Surg., 1937, 893; 1938, 811.
Chabaud, A., 413, 419, 960.
Chabot, C. See Rinjard, P., et al., jt. authors, 587.
Chaddock, T. T., 945.
Chadha, S. R., & Soni, B. N., 178.
Chambers, R., & Grand, C. G., 193.
Chance, M. R. A. See Macfie, J. M., et al., jt. authors, 787.
Chand, K., 378.
Chandler, A. C., 273, 847.
Chang, E. See Alicata, J. E., jt. author, 99.
Charipper, H. A. See Kleinberg, W., et al., jt. authors, 963.
Charitat, 88.
Charton, A. See Robin, V., jt. author, 295.
Charvet, P. See Michel-Béchet, R., et al., jt. authors, 648.
Chatterji, R. C., 98.
Chaveiro Rebelo, C. P., 839.
Chelle, P. L., 879.
Chen, H. T., 429.
Cheney, L. C. See MacCorquordale, D. W., et al., jt. authors, 458.
Cheredkov, V., 972.
Chichester, D. F., Russell, W. C., & Hudson, C. B., 613.
Chick, H., Macrae, T. F., & Worden, A. N., 956.
—, el Sadr, M. M., & Worden, A. N., 956.
Chidsey, J. A. See Dye, J. A., jt. author, 195.
China. Rep. Lester Inst. med. Res., 1937-38, 678.
Chinn, B. D. See Koser, S. A., et al., jt. authors, 328.
Chinnick, W. See Hawking, F., et al., jt. authors, 56.
Chitty, D., 603.
—, & Elton, C., 603.
Chládek, V., 65.
Chor, H., & Dolkart, R. E., 47.
Chorine, V., 20, 885.
—. See also Marchoux, E., et al., jt. authors, 835.
Chorley, J. K., 399.
Chown, B., Lee, M., Teal, J., & Currie, R., 859.
Chrétien, A., 152, 224.
Chrétien, M., & Thiery, M., 22.
Christen, P., 93.
Christensen, E. H., 666.
—, Krogh, A., & Sahlstedt, V., 550.
Christensen, J. F., 661.
—, & Porter, D. A., 246.
Christenson, R. O., 183.
Christiansen, M. J. See Jepsen, A., jt. author, 788.
Christophers, R., & Fulton, J. D., 500.
Chu, H. J. See Hoeppli, R., et al., jt. authors, 353.
Chung, H., & T'ung, T., 273.
Chung, H. L. See Feng, L. C., jt. author, 832.
Church, C. F., 37.
Churchward, R. E., 86.
Ciantini, F., 527.
Ciurdariu, P. See Benetato, G., jt. author, 468.
Clapham, P. A., 34, 100.
Clark, A., 59.
Clark, A. J., 704.
Clark, A. R. See Gay, F. P., jt. author, 461.
—. See also Gay, F. P., et al., jt. authors, 461.
Clark, R., 429.
Clark, R. L., Dixon, C. F., Butt, H. R., & Snell, A. M., 289.
Clauberg, K. W., 447.
Clausen, N. M. See Longley, B. J., et al., jt. authors, 969.
Claussen, L., 19.
Clavel, C. See Sedallian, P., et al., jt. authors, 436.
Clayson, C., 909.
Clemmesen, J. See Fridericia, L. S., et al., jt. authors, 865.
Clemmesen, S. See Fridericia, L. S., et al., jt. authors, 865.
Cloetens, R. See Verstraete, A., jt. author, 51, *bis*, 366.
Cloudman, A. M., 539.
Coburn, D. R., & Quortrup, E. R., 242.
Cockayne, A. H., 723.
Coffey, J. M., 3.
Coggeshall, L. T., 20.
Cohn, D. J., Tannenbaum, A., Thalhimer, W., & Hastings, A. B., 556.
Cohn, F., 900.
Cohn, M. L. See Corper, H. J., jt. author, 937.
Colas-Belcour, J. See Roubaud, E., jt. author, 349.
Cole, H. H., & Goss, H., 391.
Cole, R. K., 452.
—. See also Hutt, F. B., et al., jt. authors, 773.
Colebrook, L., 873.
—, & Maxted, W. R., 708.
Coleman, F. B., 638.
Coles, J. D. W. A., 753.
Collet, P. See Martin, J. F., et al., jt. authors, 860.
Collins, F. V., 788.
Colonial Empire. 1st Rep. Coun. Nutrit., Ft. I, 64.
Colson, M., 88, *bis*.
Colvin, J. W., & Mills, C. A., 606.
Colwell, C. A. See Mills, M. A., jt. author, 410.
Control Ser. Mass. agric. Exp. Sta., 495.
Cooley, R. A., 30.
Cook, J. W. See Carver, J. S., et al., jt. authors, 121.
Cooke, J. V., & Blattner, R. J., 884.
de Cooman, E. See de Waele, A., jt. author, 847.
Cooper, J. M. See Finnemore, H., jt. author, 297, 382.
Corbin, K. B., & Hinsey, J. C., 466.
Cordier, G., 924.
Corner, H. H., 117, 541.
—. See also Greig, J. R., et al., jt. authors, 117.
—. See also Morgan, D. O., jt. author, 768.
Coronel, A. B., 27.
—. See also Ferriols, V., et al., jt. authors, 158.
—. See also Generoso, J. D., et al., jt. authors, 89.
—. See also Topacio, T., et al., jt. authors, 927.
Corper, H. J., 8.
—, & Cohn, M. L., 937.
Correll, J. T., & Wise, E. C., 457.
Corson, J. F., 84, 85, 244, 413.
Corwin, G. E., 740.
Coste, 896.
Cotoni, L., & Pochon, J., 4.

Cotton, A. G. See Bartlett, A., et al., jt. authors, 283.
Cotton, W. E., 739.
—, Buck, J. M., & Smith, H. E., 912.
Couch, J. F., & Bunyea, H., 465.
—. See also Briese, R. R., jt. author, 558.
Courtade, R. See Descazeaux, J., et al., jt. authors, 436.
—. See also Urbain, A., et al., jt. authors, 937.
Coutelen, F., 523.
Cowgill, G. R. See Horwitt, M. K., jt. author, 878.
Cowie, A. T. See Barcroft, J., et al., jt. authors, 626.
Cox, G. W. See Parker, R. R., et al., jt. authors, 98.
Cox, J. A. See Johnson, E. P., et al., jt. authors, 20.
Craig, J. F., & Ratter, A., 947.
Craig, R., & Spurlock, G. M., 301.
Cramer, W., 536.
Crawford, M., 811, 893.
Creech, H. J. See Franks, W. R., jt. author, 282.
Creighton, M. M. See Anderson, R. J., jt. author, 75.
—. See also Anderson, R. J., et al., jt. authors, 822.
Crew, F. A. E., 470.
Crezée, B., 611, *bis*.
Crichton, J. A. See Bartlett, A., et al., jt. authors, 283.
Crocco, G., 927.
Crofton, W. M., 309.
Cross, S. X. See Spindler, L. A., jt. author, 352.
Crougue, O. See Marchoux, E., et al., jt. authors, 835.
Cruickshank, J. C., 11, 790.
Cruikshank, R., & Godber, G. E., 407.
Cruveilhier, L., 672.
Csato, T., Wetzler-Ligeti, C., & Wiesner, B. P., 194, 212.
Culbertson, J. T., 584, 845.
—, & Wotton, R. M., 830.
Cummins, S. L., 227, 320.
Curasson, & Phillipe, 420.
Curasson, G., 104, 356, 558.
Curnen, E. C. See MacLeod, C. M., et al., jt. authors, 806.
Currie, R. See Chown, B., et al., jt. authors, 859.
Cushing, E. C., & Parish, H. E., 97.
—. See also Parish, H. E., jt. author, 28.
Cutting, W. C. See van Winkle, W., Jr., jt. author, 792.
Cyprus. Rep. vet. Serv., 1938, 809.
Czarnetzky, E. J., Morgan, I. M., & Mudd, S., 313.
—, Mudd, S., Pettit, H., & Lackman, D., 313.
—. See also Mudd, S., et al., jt. authors, 313.
Czechoslovakia. Dis. Anim., 1938, 897.

D

Dabelstein, H., 717.
Dack, G. M. See Floyd, T. M., jt. author, 82.
—. See also Hemmens, E. S., jt. author, 55.
Daft, F. S., & Sebrell, W. H., 543.
—. See also Sebrell, W. H., et al. jt. authors, 201.
Dahlberg, G., 982.
Dahmen, 971.
Dale, H., 218.
Dalldorf, G., 95.
—, & Douglass, M., 674.
Dalling, T., 692.
—, Fraser, A. H. H., Downham, K. D., Schofield, F. W., Lamont, H. G., Watson, E. A., Hopkirk, C. S. M., du Toit, P. J., Olver, A., Purchase, H. S., Daubney R., Dobson, N., & Orr, J., 112.
—. See also Blakemore, F., jt. author, 732.
—. See also Buxton, J. B., et al., jt. authors, 736.
Damboviceanu, A. See Pop, A., et al., jt. authors, 241.
Damerow, A. P., 737.
Danbolt, N., & Mossige, K., 83.
Danckwortt, P. W., 710.
—. See also Sjollema, B., et al., jt. authors, 198.
Danforth, C. H., 892.
Dangerfield, W. G. See Boursnell, J. C., et al., jt. authors, 211.
Dann, W. J., 370.
—, & Subbarow, Y., 370.
—. See also Kohn, H. I., et al., jt. authors, 286.
—. See also Subbarow, Y., et al., jt. authors, 50.
von Darányi, J., 304.
Darlington, C. D., 404.
Darraspen, E., Florio, R., & Meymandi, M., 606.
Das Gupta, B. M., 835.
D'Ath, E. F., 949.
Datta, S., 525.
Datta, S. C. A., 935.
—. See also Dunkin, G. W., et al., jt. authors, 237.
—. See also Henry, M., et al., jt. authors, 278.
Daubney, R., 811, 940.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Dunkin, G. W., et al., jt. authors, 237.
—. See also Henry, M., et al., jt. authors, 278.
Dauvois, L. See Panisset, L., jt. author, 103.
Davesne, 962.
Davesne, M., 23.
Davey, D. G., 99, 265.
—. See also Augustine, D. L., jt. author, 100.
David, R. See Grigoraki, L., jt. author, 84.
Davidson, J. A. See Bandemer, S. L., et al., jt. authors, 709.
Davie, T. B. See Edwards, F. R., jt. author, 888.
Davis, C. L. See Shahan, M. S., et al., jt. authors, 24.
Davis, G. E., 823.
—. See also Parker, R. R., et al., jt. authors, 98.
Davis, J. G., & McClemont, J., 229.
—, & Rogers, H. J., 1, 314.
—. See also Barron, N. S., et al., jt. authors, 440.
Davis, R. E. See Madsen, L. L., jt. author, 544.
Davoli, R., 241.
Dawson, E. K. See Harvey, W., et al., jt. authors, 44.
—. See also Innes, J. R. M., et al., jt. authors, 44.
Day, F. T., 361, 944.
—. See also Miller, W. C., jt. author, 470.
Day, H. G., & McCollum, E. V., 284.
De, S. P., & Bäsu, U. P., 56.
Debiesse, J., 493.
Debono, J. E., 294.
Dechambre, E. See Urbain, A., et al., jt. authors, 906.
Dechaume, J. See Martin, J. F., et al., jt. authors, 860.
Decourt, P., Belfort, J., & Schneider, J., 126.
Deem, A. W., 465.
Deen, M. M. See Farbrother, E. S., jt. author, 219.
Defrance, M. See Ramon, G., et al., jt. authors, 38.
van Deinse, F., 735.
Dekaris, V., 734.
Delaplane, J. P., & Stuart, H. O., 473, *bis*.
Delaune, E., 214.
Delbrück, M. 842, *bis*.
Delpy, L. See Sergent, Ed., et al., jt. authors, 415, *bis*.
Demianovich, M. P., 295.
Denecke, K. See Erhardt, A., jt. author, 378.
Denison, G. A., & Dowling, J. D., 672.
—, & Leach, C. N., 840.
Denmark. Rep. vet. Direct., 1937, 66; 1938, 644.
DeOme, K. B. See Taylor, L. W., jt. author, 128.
Derbec, E., 176.
Descazeaux, J., 594, *bis*.
—, & Capelle, 848.
—, Guillot, G., & Courtade, R., 436.
Deschiens, R., 594, *ter*, 848.
Detre, L. See Bozicevich, J., jt. author, 850.
Deubler, E. C., 739.
Dtsch. tierärztl. Wschr., 67.
DeVine, B., 547, 975.
DeVita, J., 108.
Diaz, C. See Generoso, J. D., et al., jt. authors, 89.
Dibben, H. C., 65, 979.
Dick, A. T., 800.
Dickinson, E. M., & Schofield, R. H., 377.
Dickson, B. T., Bald, J. G., Burnet, F. M., Gregory, T. S., Best, R. J., Lush, D., Priestley, H., Young, W. J., Mackerras, I. M., Rubbo, & Prescott, J. A., 755.
Diencs, L., & Sullivan, E. R., 582.
Dildine, S. C., 576.
Dimock, E. R., 981.
Dimock, W. W., & Errington, B. J., 611.
—. See also Bruner, D. W., et al., jt. authors, 238.
Dingle, J. H., & Fothergill, L. D., 412.
Dinnik, J. A., & Dinnik, N. N., 267.
Dinnik, N. N. See Dinnik, J. A., jt. author, 267.
Dinulesco, G., 765.
—. See also Ionesco-Braila, G., jt. author, 765.
Disdier, C. See Anderson, C., jt. author, 185.
Ditmars, R. L., 466.
Diuligher, T. See Popovici, I., jt. author, 514.
Dixon, C. F. See Clark, R. L., et al., jt. authors, 289.
Djaenoedin, R. See Kraneveld, F. C., jt. author, 575, 706.
Djourichitch, M. See Ramon, G., et al., jt. authors, 39.
Dmochowski, L., & Knox, R., 609.
—. See also Foulds, L., jt. author, 610.
Doan, C. A. See Moore, C. V., et al., jt. authors, 696.
Dobberstein, J., & Seifried, O., 949.
Dobrynina, V. I., 623.
Dobson, N., 762.

Dobson, N. See also Dalling, T., et al., jt. authors, 112.
—. See also Henry, M., et al., jt. authors, 278.
Dodds, E. C., 389, 536.
Dodds, G. S., & Cameron, H. C., 542.
Doenecke, H., 275.
Doerr, R., & Hallauer, C., 419.
Doisy, E. A., Binkley, S. B., Thayer, S. A., & McKee, R. M., 547.
—. See also MacCorquordale, D. W., et al., jt. authors, 458.
Dolkart, R. E. See Chor, H., jt. author, 47.
Dols, M. J. L., 863.
Domagk, G., 210, 705.
Donatien, A., & Lestoquard, F., 356, 418, 503, 691, 761, 834.
—. See also Sergent, Ed., et al., jt. authors, 415, *bis*.
Donham, C. R., 271.
—. See also Edgington, B. H., jt. author, 744.
Doronin, N. N. See Lavrovskiĭ, N. E., et al., jt. authors, 669.
Dory, J., 102.
Doss, M. A. See Hassall, A., et al., jt. authors, 807.
Dougherty, T. F. See Turley, L. A., jt. author, 821.
Douglass, M. See Dalldorf, G., jt. author, 674.
Dove, W. E. See Spicer, W. J., jt. author, 97.
Dowling, J. D. See Denison, G. A., jt. author, 672.
Downham, K. D., 189, 583.
—, & Yarrow, T. B., 604.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Henry, M., et al., jt. authors, 278.
Doyle, T. M., 14.
Drabble, J., 227.
Drekter, L. See Truhlar, J., et al., jt. authors, 469.
Drieux, H. See Blanchard, L., et al, jt. authors, 363.
—. See also Verge, J., jt. author, 650.
—. See also Verge, J., et al., jt. authors, 110.
Drummond, J. C., 387.
—, Bacharach, A. L., Barrie, M. M. O., & Browne, F. J., 700.
—, Noble, R. L., & Wright, M. D., 546.
Dryerre, H., 463.
—. See also Greig, J. R., et al., jt. authors, 117.
Dschunkowsky, E., 502.
Dubois, A., 754.
—, & Kohn, I., 792, 793.
—, & Losner, S., 793.
Dubois, C., 272, 655, 657.
—, & Sollier, N., 271.
Dubois, K. P. See Moxon, A. L., et al., jt. authors, 710.
Dubos, R. J., 806.
—. See also Smadel, J. E., et al., jt. authors, 589.
Dubovic, N. M. See Alkashev, D. E., jt. author, 711.
Duckworth, C. U., 814, *bis*.
Duckworth, J., & Godden, W., 468, 629.
—, —, & Warnock, G. McM., 455.
—. See also Godden, W., jt. author, 629.
von Düring, W., & Herms, H., 920.
Duerschner, D. R. See Murphy, W. A., jt. author, 7.
DuFour, E. H. See Seibert, F. B., jt. author, 687, 770.
Dujarric de la Rivière, R., 302.
Dukalov, A. I., Apollosova, P. A., & Kulakov, K. A., 658.
Dukalov, I. A., 588.
Duke, H. L., 245.
Dumarcsq, J. A., 495, 826, *bis*.
—. See also Kelley, R. B., jt. author, 141.
—. See also Philp, R. C. T., et al., jt. authors, 784.
Duncan, C. W., Lightfoot, C. C., & Huffman, C. F., 134, 797.
—. See also Hale, E. B., et al., jt. authors, 880.
Duncan, J. T., 852.
Dungal, N., 274.
Dunkin, G. W., Hopkirk, C. S. M., Minett, F. C., Lamont, H. G., Watson, E. A., Whitty, J. D., Olver, A., Datta, S. C. A., Daubney, R., Laidlaw, P., & Stableforth, A. W., 237.
Dunlap, G. L. See Brandly, C. A., jt. author, 177, 930.
Dunlop, G., Innes, J. R. M., Shearer, G. D., & Wells, H. E., 612.
Dupin, F., 537.
Durand, P., 293, *bis*, 462.
Durant, A. J., & McDougle, H. C., 782.
Dustman, R. B. See Weakley, C. E., Jr., jt. author, 61.
Dutch East Indies. Rep. vet. Inst., Buitenzorg, Java, 1937, 68; 1938, 480.
Dutcher, R. A. See Bechdel, S. I., et al., jt. authors, 51.
—. See also Flora, C. C., et al., jt. authors, 614.
Duthie, D. W., 541.
Dye, J. A., & Chidsey, J. A., 195.
Dzasókhov, G. S. See Markov, A. A., et al., jt. authors, 919.

E

Eagleson, C., 961.
Ebert, R. H., & Florey, H. W., 561.
Ebertz, E. G., & Lobitz, W. C., Jr., 488.
Eccles, A., 755.
Eddie, B. See Meyer, K. F., jt. author, 677, *bis*.
—. See also Meyer, K. F., et al., jt. authors, 272.
Eden, A., 468, 539, 635, 800, 805.
—, & Green, H. H., 708.
Edgar, C. E., & Macrae, T. F., 867.
—, —, & Vivanco, F., 867.
—, el Sadr, M. M., & Macrae, T. F., 867.
—. See also Macrae, T. F., jt. author, 867.
Edgar, G., 875.
Edgar, S. A. See Ackert, J. E., et al., jt. authors, 431.
Edgington, B. H., 379.
—, & Donham, C. R., 744.
—, & Schalk, A. F., 90.
Edwards, F. R., 888.
—, & Davie, T. B., 888.
Edwards, J., 472.
—. See also Walton, A., jt. author, 469.
Edwards, P. R., 12.
—. See also Bruner, D. W., jt. author, 324.
—. See also Bruner, D. W., et al., jt. authors, 238.
Edwards, S. J., 229, 573.
Egan, T. J., 219.
Egorov, I. A., 490, 733.
Ehrlich, C., 374.
Eichhorn, E. A., & Manthei, C. A., 172.
Eichler, W., 429.
Eilmann, 950.
Eire. Rep. Dis. Anim., 1938-39, 978.
—. Rep. vet. Coll. Ire., 1938-39, 978.
—. Rep. vet. Res. Lab., 1938-39, 978.
Ejury, F., 385.
Elder, C., 271.
El-Gheriany, 547.
Elkington, G. W., Wilson, G. S., Taylor, J., & Fulton, F., 788.
Ellis, A. A. B. See White, E. G., jt. author, 460.
Ellis, N. R., & Madsen, L. L., 784.
—. See also Gamble, J., et al., jt. authors, 140.
Elton, C. See Chitty, D., jt. author, 603.
Elvehjem, C. A. See Arnold, A., jt. author, 114, 286.
—. See also Axelrod, A. E., et al., jt. authors, 456.
—. See also Bird, H. R., et al., jt. authors, 955.
—. See also Frost, D. V., jt. author, 786.
—. See also Hegsted, D. M., et al., jt. authors, 202.
—. See also Hove, E., et al., jt. authors, 196.
—. See also Wooley, D. W., et al., jt. authors, 121.
Emanuiloff, I., 650.
Emerson, G. A. See Evans, H. M., et al., jt. authors, 289.
—. See also Telford, I. R., et al., jt. authors, 202, 289.
Emmel, M. W., 267, 952.
Emoto, O., 870.
van den Ende, M., 186.
Ender, F., & Helgebostad, A., 698.
Enders, J. F., & Hammon, W. D., 841.
—. See also Hammon, W. D., jt. author, 606.
Endrejat, E., 58, 574, 971.
Engel, R. W., & Phillips, P. H., 287, 369.
—, Phillips, P. H., & Halpin, J. G., 699.
—. See also Phillips, P. H., jt. author, 287, 866.
Engelbreth-Holm, J., 341.
Enigk, K. See Wetzel, R., jt. author, 582, 597.
Eppson, H. F. See Beath, O. A., et al., jt. authors, 796.
—. See also Bradley, W. B., et al., jt. authors, 131, *bis*.
Epstein, P., 718.
Erban, 890.
Erdös, I., 454.
Erhardt, A., & Denecke, K., 378.
Eriksson, K., 190.
Erlich, I., 345.
—, & Mikacić, D., 346.
Eröss, I., 171.
Errington, B. J. See Dimock, W. W., jt. author, 611.
Espe, D. L., 226.
Esselen, W. B., Jr., 120.
Essex, H. E. See Hester, H. R., et al., jt. authors, 802.
Euler, 412.
Evans, A. C., & Verder, E., 231.
Evans, B. See Hanks, J. H., jt. author, 771.
Evans, C. A. See Green, R. G., jt. authors, 928.
—. See also Green, R. G., et al., jt. authors, 861.
Evans, E. See Hart, B. F., jt. author, 554.
Evans, F. L., 940.
Evans, G., 722.

Evans, G. M. See Gaisford, W. F., et al., jt. authors, 618.
Evans, H. M., Emerson, G. A., & Telford, I. R., 289.
—. See also Telford, I. R., et al., jt. authors, 202, 289.
Eveleth, D. F., & Schwartz, L. H., 175.
—. See also Biester, H. E., jt. author, 195.
—. See also Biester, H. E., et al., jt. authors, 44.
—. See also Eveleth, M. W., et al., jt. authors, 612.
—. See also McNutt, S. H., et al., jt. authors, 392.
—. See also Schwartz, L. H., et al., jt. authors, 623.
Eveleth, M. W., Eveleth, D. F., & Walsh, F. E., 612.
Eyraud, 476.

F

Fairbrother, R. W., & Martin, A. E., 426.
Fairley, N. H., 104.
Faliński, S., 431.
Falk, K. G. See Glaubiger, A., jt author, 474.
—. See also Siegel, L., et al., jt. authors, 457.
—. See also Truhlar, J., et al., jt. authors, 469.
Farber, L. See Sure, B., et al., jt. authors, 193.
Farbrother, E. S., & Deen, M. M., 219.
Farr, M. M. See Hassall, A., et al., jt. authors, 207.
Farrell, M. A. See Hechler, M. C., jt. author, 993.
Faure, 782, 795.
Faust, E. C., 183.
—, Sawitz, W., Tobie, J., Odom, V., Perez, C., & Lincicome, D. R., 394.
Fearon, W. R., 815.
Fecond artif., 726.
Feldman, H. A. See Hanks, J. H., jt. author, 823, 824.
Feldmann, L., 253.
Feldman, W. H., 354, 491, 492.
—, & Baggenstoss, A. H., 492.
—, & Hinshaw, H. C., 792.
Fell, H. B., & Grunberg, H., 535.
Feng, L. C., & Chang, H. L., 382.
—, & Hoepplı, R., 161.
—. See also Hoepplı, R., et al., jt. authors, 353.
Fenwick, D. W., 683.
Ferauge, A., 490.
Ferguson, J., 128.
Fernbach, E., & Rullier, G., 822.
Ferreira, A. J., 7.
Ferriols, V., Gabriel, G. L. S., & Coronel, A. B., 158.
Fertig, H. See Köbe, K., jt. author, 92.
Ferwerda, S. See Tenhaeff, C., jt. author, 767.
Ficola, G., & Torti, E., 570.
Fiennes, R. N. T. W., 118.
Fieser, L. F., 547.
Fildes, P. See McIlwain, H., et al., jt. authors, 157.
Filipovic, D., 233.
Filmer, J. E., 979.
Finch, E., 975.
Fincher, M. G., & Hayden, G. E., 725.
Findlay, G. M., 87.
—, & Innes, J. R. M., 837.
—, Kliencberger, E., MacCallum, F. O., & MacKenzie, R. D., 27.
Findlay, G. M., Mackenzie, R. D., MacCallum, F. O., & Klieneberger, E., 165.
Finkelstein, H. See Beard, J. W., et al., jt. authors, 589.
Finkelstein, M. See Guggenheim, A., jt. author, 7.
Finnemore, H., & Cooper, J. M., 297, 382.
Fischer, H., 302.
Fischer, M. H., & Suer, W. J., 135.
Fitch, C. P., & Bishop, L. M., 290.
—, Boyd, W. L., & Bishop, L. M., 14.
—, —, & Kelly, M., 59.
—. See also Roepke, M. H., jt. author, 712, 852.
Fitch, J. W. S., Grimmett, P. E. R., & Wall, E. M., 361.
Flament, E., & Martin, L., 514.
Flamo, A., 567.
Flamenbaum, C., 542, 651.
—, & Gantt, R., 540.
—, Gelzayd, B., & von Hayn, L., 52.
Fleming, A., 522, 612.
Fleming, C. E., Mercer, M. R., Tawter, J. R., & Young, A., 131.
Fleming, W. L. See Turner, T. B., jt. author, 923.
Flight, C. H., 948.
Flory, E. V., Hosier, H. R., & Bohman, J. L., 629.
Flora, C. C., Ward, R. E., Bozeman, G. T., Gourrier, N. B., & Dutcher, R. A., 614.
Florence, G. See Verge, J., et al., jt. authors, 110.
Florey, H. W., Jennings, M. A., Jennings, D. A., & O'Connor, R. C., 356.
—. See also Lloyd, R. H., jt. author, 561.
Flores, 346.
Flores, R. See Darraspen, E., et al., jt. authors, 606.
Floyd, T. M., & Dack, G. M., 82.
Flückiger, 506.
Fluckiger, G., 505, 721.
Fogedby, E. E., 886.
—, & Harbo, J., 359.
Foggia, A., & Mazzeo, E., 327.
Folgia, V. G. See Selye, H., jt author, 352.
Folsey, S. J., & Watson, H. M. S., 391.
—. See also Bottomley, A. C., et al., jt. authors, 464, *bis.*
Follis, R. H., Jr., 668, *bis.*
—, & Rich, A. R., 873.
—. See also Rich, A. R., jt. author, 552, 705.
Fombon, A. T., 759.
Fonseca, P., 949.
Fontes, J. C., & Gothouse, E. L., 922.
Ford, J. See Aoman, R. W. M., jt. author, 511.
Forrester, J. S., & Langner, P. H., Jr., 893.
—. See also Langner, P. H., Jr., jt. author, 892.
Forster, Z., 701.
Fortman, P. H. See Barcroft, J., et al., jt. authors, 626.
Foreman, J., 573.
—, & Magnusson, H., 668.
Fortner, J., 772.
Foster, R. L. See Reynolds, S. R. M., jt. author, 472.
Foster, K. J., 226.
Fothergill, L. D. See Dingle, J. H., jt. author, 412.
Foulds, L., & Dmochowski, L., 610.
Fourestier, M. See Sergent, Em., et al., jt. authors, 347.
Fowler, E. J. L., 776.
Fouts, P. J., Helmer, O. M., Leprovsky, S., & Jukes, T. H., 202.
—. See also Helmer, O. M., jt. author, 200.
Fowler, G. A., 388.
Fowler, W. M., & Barer, A. P., 788.
Fox, H., 42, 155.
Foy, H., & Kondi, A., 120.
France. Rep. vét. Serv., Paris, 1937, 152; 1938, 224.
Francis, T., Jr. See Magill, T. P., jt. author, 931.
Frank, I. See Blahd, M., et al., jt. authors, 46.
Franken, F. See van Niekerk, J., jt. author, 51.
Franks, W. R., & Creech, H. J., 284.
Franzke, C. J., Puhr, L. F., & Hume, A. N., 558.
Frappier, A., & Fredette, V., 102, 355.
Fraser, A. C., 353, 582.
Fraser, A. H. H., Godden, W., Snook, L. C., & Thomson, W., 240.
—. See also Dalling, T., et al., jt. authors, 112.
Fraser, H. F., Topping, N. H., & Isbell, H., 544.
—. See also Sebrell, W. H., et al., jt. authors, 201.
Frauchiger, E., & Hofmann, W., 675, 712.
—, & Messerli, W., 675, *bis.*
Fredette, V. See Frappier, A., jt. author, 102, 355.
Freeman, A. E., Jr. See Arnett, J. E., et al., jt. authors, 893.
Freeman, M. See Barker, F. M., jt. author, 234.
—. See also Barker, F. M., et al., jt. authors, 77.
Frei, W. Z., 939.
French, M. H., 556.
Frenzel, H., 199.
Frenkiel, N., 418.
Frens, A. M., 545.
—. See also Brouwer, E., et al., jt. authors, 269.
Freyer, H. J., 980.
Frick, E. J. See Bernstein, L. D., et al., jt. authors, 636.
Frick, L. P. See Arnett, J. E., et al., jt. authors, 631.
Friedrich, J., 21.
—. See also Lawrence, O., et al., jt. authors, 329.
Fries, L., 612.
Frisenius, L., & Gothouse, E., & Gothouse, B., Gothouse, E., & Gothouse, J., 787.
Friedmann, C., & Zinger, B., 38, 438.
—, & Hollander, A., 438.
Friedman, E. A. H., 793.
Friesen, A., 787.
Fritz, J. C., Archer, W., & Barker D., 287.
Fritzche, K., 224.
Fröberg, K., 204.
Frost, D. V., & Livingston, C. A. 786.
Frye, W. W. See Meleney, H. E., et al., jt. authors, 915.
Frykholm, N., 152, 645.
Fujii, T. See Watanuki, T., jt. author, 35.
Fujimura, S., 423.
Fujita, J., 582.

Fulton, F. See Elkington, G. W., et al., jt. authors, 788.
Fulton, J. D. See Christophers, R., jt. author, 500.
Furth, J. See Kabat, E. A., jt. author, 858.
—. See also Schweitzer, M. D., jt. author, 192.
Furth, O. B., Barnes, W. A., & Brower, A. B., 859.

G

Gabriel, G. L. S. See Ferriols, V., et al., jt. authors, 158.
Gaede. See Müssemeier, jt. author, 725.
Gagarin, V. G. See Petrov, A. M., jt. author, 430.
Gaillard, H., 349.
Gaisford, W. F., Evans, G. M., & Whitelaw, W., 618.
Gaitandjieff, G., 232.
Gallia, E., 43.
Galliano, E. J. See Sergent, Em., et al., jt. authors, 347.
Galliard, H., 526.
Galli-Valerio, B., 106.
Gallup, W. D., & Norris, L. C., 118.
Gambarov, G. S., & Laktionova, A. I., 490.
Gambia. Rep. Dep. Agric., 1938-39, 568.
Gamble, J., Ellis, N. R., & Besley, A. K., 140.
Gambles, R. M., 943.
Gambrell, E. See Travis, B. V., et al., jt. authors, 170.
Ganguli, H. D. See Bagchi, K. N., jt. author, 382.
Ganslmayer, R., 522, *bis*.
García, J. A. R. See Pou, M. C., et al., jt. authors, 415, 686.
Garlick, G. G. See Rees, C. W., jt. author, 661.
Garpman, I., 821.
Garside, J. S., 13.
Gatt, J. E. H., 655.
Gaubert. See Giraud, P., jt. author, 831.
Gauducheau, A., 841.
Gaus, O., 536.
Gavrilov, W., Bobkoff, G., & Laurencin, S., 247.
—, & Laurencin, S., 499.
—, & Nijs, J., 970.
Gay, F. P., & Clark, A. R., 461.
—, —, Street, J. A., & Miles, D. W., 461.
Gebauer, B. See Fleischhauer, G., et al., jt. authors, 52.
Geertsema, G., 945.
Geiger, W., 175, 839, 929.
Gelormini, N., 169.
Generoso, J. D., Coronel, A. B., & Diaz, C., 89.
Gerlach, F., 447, *bis*., 756, 923.
Germany. Anim. Dis. Stat., 1936, 570.
—. Rep. Govt Vets., Prussia, 1935 & 1936, 725.
Gerst, V., 317.
Gerstner, R., 957.
Gey, G. O., Seegar, G. E., & Hellman, L. M., 390.
Ghose, S. C., 219.
Giebner, O., 207.
de Gier, C. J., 611.
Gilbert, C. S. See Beath, O. A., et al., jt. authors, 796.
Gildemeister, E., Haagan, E., & Waldmann, O., 153.
Gillon, A. See le Roux, G., jt. author, 77.
Gilman, H. L., 39.
Gilruth, J. A., 146.
Giltner, L. T. See Shahan, M. S., et al., jt. authors, 24.
Giltner, W., 153, 547, 815.
Ginièis. See Malterre, et al., jt. authors, 563.
Gintscheff, P. Z., 884.
Girard, G., 897.
—, & Girard, M., 293.
Girard, H., 512.
Girard, M. See Girard, G., jt. author, 293.
Giraud, P., & Gaubert, 831.
Girlestone, G. R., 576.
Giroud, P., 663.
Gisske, W. See Nickel, R., jt. author, 395.
Giuntini, J. See Levaditi, C., et al., jt. authors, 94.
Givens, H. C., 739.
Gladstone, G. P., 574.
—. See also McIllwain, H., et al., jt. authors, 157.
Glässer, 36.
Glaser, R. W., & Stoll, N. R., 265.
Glaubiger, A., & Falv, K. G., 474.
Glock, G. E., Murray, M. M., & Glover, R. E., 454.
Glover, R. E., 267, 269, 929.
—. See also Andrewes, C. H., jt. author, 364.
—. See also Buxton, J. B., jt. author, 322.
—. See also Griffith, A. S., jt. author, 322.
—. See also Buxton, J. B., et al., jt. authors, 736.
—. See also Glock, G. E., et al., jt. authors, 454.
Gloyne, S. R., 290.
Glukhovtsev, G. D., 904.
Gochenour, W. S., Stein, C. D., & Osteen, O. L., 125.
Godber, G. E. See Cruikshank, R., jt. author, 407.
Godden, W., & Duckworth, J., 629.
—. See also Duckworth, J., jt. author, 468, 629.
—. See also Duckworth, J., et al., jt. authors, 455.
—. See also Fraser, A. H. H., et al., jt. authors, 540.
Goetchius, G. R. See Olson, C., jt. author, 738.
Goettsch, M., & Ritzmann, J., 700.
—. See also Pappenheimer, A. M., et al., jt. authors, 203, 786.
Götze, R., 107, 412, 837.
Gözsy, B., & Schneider, L., 177.
Goff, O. E., & Upp, C. W., 875.
van Goidsenhoven, C., & Schoenaers, F., 239, 330, 408.
Gold Coast. Rep. Dep. Anim. Hlth, 1938-39, 307.
Goldblatt, H. See György, P., jt. author, 50.
Golding, F. D., 96.
Goldstine, F. See Manwell, R. D., jt. author, 125, 833.
Golledge, S. V., 641, *bis*.
Goncharov, N. P., 759.
González, L. M. See Otero, P. M., jt. author, 688.
Goodlow, R. J. See Green, R. G., et al., jt. authors, 861.
Goodwin, M. H., Jr. See Travis, B. V., et al., jt. authors, 170.
Gopalaskrishnan, V. R. See Rajagopalan, V. R., jt. author, 411.
Gordon, A. S. See Kleinberg, W., et al., jt. authors, 963.
Gordon, H. McL., 127, 555, 846, 847, *bis*, 875, *bis*, 876, 877.
—, & Whitlock, H. V., 217.
Gordon, R. F. See Henry, M., et al., jt. authors, 278.
Gordon, W. S. See Stewart, J., et al., jt. authors, 775.
Gorer, P. A. See Henderson, D. W., jt. author, 704.
Goret, P., 434.
—. See also Berthelon, M., jt. author, 589.
Gorovitz, C., 378.
Gorshkov, I. P., 430.
Gortner, R. A., Jr., & Lewis, H. B., 622.
—. See also Lewis, H. B., et al., jt. authors, 963.
Goss, H. See Cole, H. H., jt. author, 391.
Goss, L. J., 608.
Grabar, P., & de Loueiro, J. A., 631.
—. See also Levenson, S., jt. author, 748.
Graessle, O. See Molitor, H., et al., jt. authors, 873.
Graf, 802.
Graham, J. D. P., 967.
Graham, R., 325, 576.
—, Hester, H. R., & Levine, N. D., 577.
—, Levine, N. D., & Hester, H. R., 76.
Graham, W. R., Jr. See Houchin, O. B., et al., jt. authors, 135.
Grand, C. G. See Chambers, R., jt. author, 193.
Grant, J. See Radley, J. A., jt. author, 647.
Grasovsky, Y. S., 113.
Grassmann, W. See Bertho, A., jt. author, 310.
Gratiolet, G. See Rinjard, P., et al., jt. authors, 587.
Graves, R. R. See Swett, W. W., et al., jt. authors, 140, 605, 949.
Gray, D. G., 888.
Gray, E., 191.
Great Britain. Minist. Hlth Rep. TB. Serv., Wales, 1939, 491.
—. Pamph. roy. Soc. Prevent. Cruelty Anim., Lond., 721.
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—. Rep. Lond. Sch. Hyg., 1936-37, 147; 1937-38, 974.
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—. Rep. med. Res. Coun., 1938-39, 807.
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Great Britain. Rep. vet. Offr Bgham, 1939, 976.
—. Rep. vet. Offr Lanark, 640.
—. Rep. vet. Offr Newcastle, 1938, 976.
—. Therap. Subs. Amend. Comm., 889.
—. Wilts. (County) Coun., 641, *bis*.
Green, C. A., 394.
Green, H. H. See Allcroft, W. M., jt. author, 695.
—. See also Eden, A., jt. author, 708.
Green, R. G., 50, 425, *bis*.
—, & Evans, C. A., 925.
—, Goodlow, R. J., Evans, C. A., Peyton, W. T., & Titrud, L. A., 861.
—, Larson, C. L., & Mather, D. W., 692.
Green, W. W., 881.
Greene, J. E. See Mundhenk, R. L., jt. author, 525.
Greep, R. O. See Astwood, E. B., jt. author, 390, *bis*.
Gregersen, M. I., & Painter, E., 135.
Gregory, T. S., 776, 855.
—. See also Dickson, B. T., et al., jt. authors, 755.
Greig, J. R., 304.
—, Dryerre, H., Corner, H. H., & Smith, A. M., 117.
Grgić, A., 326.
Grieder, H., 769.
Griffith, A. S., 234, *bis*, 651, *bis*.
—, & Glover, R. E., 322.
Griffith, H. D., Irving, J. T., & Mason, E. M., 212.
Griffiths, W. F. B. See Amoroso, E. C., et al., jt. authors, 392.
Grigoraki, L., & David, R., 84.
Grimmett, R. E. R., 197.
—, & McIntosh, I. G., 381.
—, —, Wall, E. M., & Jones, G. B., 381.
—. See also Fitch, L. W. N., et al., jt. authors, 381.
Grinberg, K., 416.
Grini, O., 557.
Groat, R. A., 144.
de Grolier, A., & Voiculesco, T., 123.
Grosso, A. M., & Prieto, C., 251.
Groulade, 962.
Grüneberg, H. See Fell, H. B., jt. author, 535.
Gusev, V. F., Balykin, M. T., Mel'nikov, D. D., & Terent'ev, P. S., 917.
Grzycki, S., 835.
Gudjonsson, S. See Fridericia, L. S., et al., jt. authors, 865.
Guérillot. See Malterre, et al., jt. authors, 563.
Guérin, P. See Marchal, S., et al., jt. authors, 453, *bis*.
Guerrant, N. B. See Bechdel, S. I., et al., jt. authors, 51.
—. See also Flora, C. C., et al., jt. authors, 614.
—. See also Ward, R. E., et al., jt. authors, 544.
Guggenheim, A., & Finkelstein, M., 7.
Guibert, J., & Boscq, H., 829.
Guilhon, J. See Henry, A., jt. author, 29.
Guillaumie, M. See Weinberg, M., jt. author, 659.
Guillot, G. See Descazeaux, J., et al., jt. authors, 436.
Gunn, J. A., 211.
Guo, K. D., 27.
Gur'eva, A. M. See Orlov, N. P., et al., jt. authors, 768.
Gurevitch, I. See Kleeberg, J., et al., jt. authors, 462.
Gurley, M. K. See Hoyt, A., jt. author, 673.
Gurney, E. H., 568.
Gutierrez, H. P., 465.
Gwatkin, R., 759.
Gye, W. E., 536.
György, P., & Goldblatt, H., 50.

H

Haagen, E. See Gildemeister, E., et al., jt. authors, 153.
Haalck, O., 56.
Haber, P., 506, 836, 929, 930.
Habermann, R. T., & Harwood, P. D., 555.
—, —, & Hunt, W. H., 878.
—. See also Harwood, P. D., et al., jt. authors, 575.
Habs, H., & Bader, R., 957.
Haddow, A., 282, *bis*.
Hadfield, G., 445.
Hadwen, S., 307.
Häfti, J., 535.
Hagan, W. A., 683, 899.
Hagemann, P. K. H., 716.
Hahn, P. F., Bale, W. F., Hettig, R. A., Kemen, M. D., & Whipple, G. H., 798.
—, —, Lawrence, E. O., & Whipple, G. H., 696.
—, Ross, J. F., Bale, W. F., & Whipple, G. H., 798.
Haller, E., von Bockelburg, U., & Burckhardt, 317.
Haines, R. B., 296, 469.
—, & Scott, W. J., 702.
—. See also Lea, D. E., jt. author, 970.
Hajdu, G., 183.
—, & Korzenszky, J., 238.
Haji, C. S. G. See Bawa, H. S., jt. author, 519.
Halberstaedter, L., 749.
Haldane, J. B. S., 920.
Hale, E. B., Duncan, C. W., & Huffman, C. F., 880.
Hale, W. M. See Porter, J. R., jt. author, 957.
Hall, H. T. B. See Bennetts, H. W., jt. author, 854.
Hallauer, C. See Doerr, R., jt. author, 419.
Haller, E., 629.
Hallman, E. T. See Langham, R., jt. author, 108.
—. See also Thorp, W. T. S., jt. author, 187.
Hallmich, P., 361.
Halpin, J. G. See Bird, H. R., et al., jt. authors, 955.
—. See also Engel, R. W., et al., jt. authors, 699.
Halterhoff, R., 252.
Hamerski, E., 187.
Hamilton, C. M., & Sawyer, C. E., 953.
Hamilton, J. D. See Rich, A. R., jt. author, 543.
Hamilton, W. J. See Amoroso, E. C., et al., jt. authors, 392.
Hammer, 110.
Hammon, W. D., 566.
—, & Enders, J. F., 696.
—. See also Enders, J. F., jt. author, 841.
Hammond, J., 443.
Hamon, V. See Rist, N., et al., jt. authors, 375, 909.
Hancock, E. E. I. See Archibald, R. M., jt. author, 284.
Handa, B. N., 721.
Hankin, T. H., 35.
Hanks, J. H., 882.
—, & Evans, B., 771.
—, & Feldman, H. A., 883, 884.
Hansen, P., 58.
Harbo, J. See Fogedby, E. F., jt. author, 509.
Hardenbergh, J. G., 749.
—, & Mills, A. M., 919.
Hardy, W. T. See Boughton, I. B., jt. author, 192.
Hare, R., 355.
Harford, C. G. See Olitsky, P. K., jt. author, 925.
Haring, C. M. See Schalm, O. W., jt. author, 62.
Harman, M., Kramer, M. M., & Karns, H. D., 545.
Harris, F., 162.
Harnisch, O., 260.
Harper Adams Util. Poult. J., 359.
Harpøth, H., 908.
—. See also Cabasso, V., et al., jt. authors, 366.
Harr, J. F. See Hinshaw, W. R., et al., jt. authors, 688.
Harrelson, R. T. See Sure, B., et al., jt. authors, 168.
Harrelson, R. T., Jr. See Sure, B., et al., jt. author, 369.
Harris, A. H., 474.
Harris, J. S. See Michel, H. O., jt. author, 467.
Harris, L. J., 866.
Harris, R. H. T. P., 520.
Harrison, H. C., & Long, C. N. H., 712.
Hart, B. F., & Evans, E., 504.
Hart, E. B. See Bird, H. R., et al., jt. authors, 955.
—. See also Hegsted, D. M., et al., jt. authors, 202.
—. See also Hove, E., et al., jt. authors, 196.
Hart, L., 169.
—. See also Hindmarsh, W. L., et al., jt. authors, 163.
—. See also Hungerford, T. G., jt. author, 763.
Hartmann, O. See Bee, J., et al., jt. authors, 498.
Harvey, A. M. See Brown, G. L., jt. author, 276, 612.
Harvey, H. I., Smith, D. T., Persons, E. L., & Burns, M. V., 867.
Harvey, R. A. See Ide, H. G., et al., jt. authors, 363.
Harvey, W., Dawson, E. K., & Innes, J. R. M., 44.
—. See also Innes, J. R. M., et al., jt. authors, 44.
Harwood, P. D., Habermann, R. T., Roberts, E. H., & Hunt, W. H., 878.
—. See also Habermann, R. T., jt. author, 555.
—. See also Habermann, R. T., et al., jt. authors, 878.
—. See also Underwood, P. C., jt. author, 350.
van Haselen, W. H. See Jansen, J., jt. author, 579.
Hassall, A., Doss, M. A., Farr, M. M., Carson, G. B., & Bero, D., 807.
Hastings, A. B. See Cohn, D. J., et al., jt. authors, 556.
Hastings, E. G., & Beach, B. A., 230.
—. See also McCarter, J., jt. author, 410.
—. See also McCarter, J., et al., jt. authors, 687.
Hauduroy, P., 497.
Hauge, K., 853.
Haun, F. See Bischoff, O., jt. author, 716.

Haupt, H., 825, 851.
—. See also Klimmer, M., jt. author, 69, 207.
Haury, V. G. See Cantarow, A., jt. author, 215.
Hauser, H. See Ziegler, H., jt. author, 559.
Hawking, F., 125, 462, *bis*, 749.
—, Hennelly, T. J., Wales, W. T., Chinnick, W., & Barrett, R. E., 56.
Hayden, O. C. See Knoop, C. E., et al., jt. authors, 456.
Hayden, C. E. See Fincher, M. G., jt. author, 795.
von Hayn, L. See Fleischhauer, G., et al., jt. authors, 52.
Hlth, Canberra, 64.
Hechler, M. C., & Farrell, M. A., 903.
Hegsted, D. M., Oleson, J. J., Elvehjem, C. A., & Hart, E. B., 202.
Hegner, R., 919.
Hegyeli, Z., 212, 232.
Hehre, E., 883.
Heidelberger, M., 102.
—. See also Menzel, A. E. O., jt. author, 9.
Heiman, V. See Carver, J. S., et al., jt. authors, 121.
Heise, F. H., & Steenken, W., Jr., 321.
Heishman, J. O. See Miller, W. T., et al., jt. authors, 703.
Helgebostad, A. See Ender, F., jt. author, 698.
Hell, H., 407.
Hellman, L. M. See Gey, G. O., et al., jt. authors, 390.
Helmer, O. M., & Fouts, P. J., 200.
—. See also Fouts, P. J., et al., jt. authors, 202.
Hemmens, E. S., & Dack, G. M., 55.
Hemmings, A. W. See Rimington, C., jt. author, 374.
Henchoz, E., 632.
Henderson, 804.
Henderson, D. W., & Gorer, P. A., 704.
Henderson, G. T., 724.
Henderson, W. W., 568.
Hendrick, J., & Moore, W., 342.
Hennelly, T. J. See Hawking, F., et al., jt. authors, 56.
Henninger, R. See Zeller, H., jt. author, 913.
Henrard, C. See Brutsaert, P., jt. author, 245.
Henrici, A. T., 498, 583, 899.
Henry, A., & Guilhon, J., 29.
Henry, M., Dobson, N., Cabot, D. A. E., du Toit, P. J., Olver, A., Downham, K. D., Datta, S. C. A., Schofield, F. W., Watson, E. A., Gordon, R. F., & Daubney, R., 278.
—. See also Ross, I. C., et al., jt. authors, 178.
Hensel, G., 35.
Hepding, L., 417.
Herlitz, C. W., 319.
Herman, J. R. See Rothbard, S., jt. author, 191.
Hermann, G., 599.
Hermansson, K. A., 491, 701.
Herms, H. See von Düring, W., jt. author, 920.
Heron, G. W., 724.
Herrick, C. A., 750.
Herrold, R. D., & Woolsey, C. I., 8.
Hess, W. R., 302.
Hester, H. R., Essex, H. E., & Mann, F. C., 802.
—. See also Flock, E. V., et al., jt. authors, 629.
Hester, H. R. See also Graham, R., et al., jt. authors, 76, 577.
Hettig, R. A. See Hahn, P. F., et al., jt. authors, 798.
Hetyéssy, I., 251.
Hetzel, H., 190.
Heuser, G. F. See Schumacher, A. E., jt. author, 866.
Heydon, G. A. M., & Bearup, A. J., 100.
Hicok, H. See Whitehead, H. G., jt. author, 321.
Hignett, S. L., & King, W. S., 872.
Hilston, N. W. See Bechdel, S. I., et al., jt. authors, 51.
Hilton, G., 305.
Himmelfarb, J. K., 394.
Hindmarsh, W. L., 81.
—, Stewart, D. F., & Hart, L., 163.
Hines, H. M. See Knowlton, G. C., et al., jt. authors, 288, 787.
Hinsey, J. C. See Corbin, K. B., jt. author, 466.
Hinshaw, H. C. See Feldman, W. H., jt. author, 702.
Hinshaw, W. R., Jones, E. E., Harr, J. F., & Niemeyer, W. E., 689.
Hirato, K., 417, 654.
Hitchener, E. R. See Lewis, K. H., jt. author, 79.
Hixson, H., 98.
Hiyeda, K., & Terada, B., 58.
Hjärre, A., 319.
—. See also Carlström, B., jt. author, 25.
Hoare, C. A., 750.
—, & Bennett, S. C. J., 244.
Hobmaier, A., & Hobmaier, M., 933.
Hobmaier, M. See Hobmaier, A., jt. author, 933.
Hobson, F. C. G., & Witts, L. J., 954.
Hobson, R. P., 342, 554.
—. See also Ross, I. C., et al., jt. authors, 178.
Hodes, H. L. See Webster, L. T., jt. author, 529.
van der Hoeden, J., 327, 530.
Höge, W., 858.
Hoeppli, R., Feng, L. C., & Chu, H. J., 353.
—. See also Feng, L. C., jt. author, 181.
Hoff, H. E., Smith, P. K., & Winkler, A. W., 624.
Hoffman, H. A., 857.
Hoflund, S., 854, *bis*.
Hofmann, W. See Frauchiger, E., jt. author, 675, 713.
Hofstra, H. See van Niekerk, J., jt. author, 699.
Hogan, A. G., & Parrott, E. M., 543.
Holcomb, W. F. See MacCorquordale, D. W., et al., jt. authors, 458.
Hole, N. H., & Hulse, E. C., 531.
Holland. Rep. anim. Hlth Serv., Friesland, 1938-39, 480.
—. Rep. publ. Hlth Insp., 1938, 570.
—. Rep. St. Serum Inst., 1937, 479; 1938, 979.
—. Rep. vet. Res. Inst., 1936 & 1937, 479.
Hollander, A. See Friedemann, U., et al., jt. authors, 436.
Holman, H. H., 775.
—. See also Stewart, J., jt. author, 713.
Holmberg, J., 960.
Holmes, A. D., Tripp, F., & Satterfield, G. H., 865.
Holth, H., 777, 826.
Holtz, F., & Rossman, E., 142.
Honess, R. F., 57.
Hong Kong. Rep. colon. vet. Surg., 1938, 725.
Hont, I., 175.
t'Hooft, P. J., 318.
—, & Veenbaas, A. H., 268.
Hooker, S. B. See Boyd, W. C., jt. author, 433.
Hopkirk, C. S. M. See Dalling, T., et al., jt. authors, 112.
—. See also Dunkin, G. W., et al., jt. authors, 237.
—. See also Ross, I. C., et al., jt. authors, 178.
Hornby, H. E., 438.
Horner, I., 18.
Hornus, G. J. P., 931.
Horsfall, F. L., Jr., 26.
—. See also Hughes, T. P., et al., jt. authors, 301.
Horsfall, M. W., 593.
Horton-Smith, C., & Taylor, E. L., 246.
Horváth, I., 712.
Horváth, L., 438.
Horwitt, M. K., & Cowgill, G. R., 878.
Hotzel, J. See Sjollema, B., et al., jt. authors, 198.
Houchin, O. B., Graham, W. R., Jr., Peterson, V. E., & Turner, C. W., 195.
Hove, E., Elvehjem, C. A., & Hart, E. B., 196.
How, A. E., 433.
Howard, M. See Kolmer, J. A., et al., jt. authors, 657.
Howarth, C. R., & Seghetti, L., 71.
Howe, J. S., 73, 735.
Hoyt, A., & Gurley, M. K., 673.
Hsiung, T., 834.
Huber, F. L., 68, 480.
Huddleson, I. F., 648, 826.
—, & Pennell, R. B., 527.
—. See also Stahl, W. H., et al., jt. authors, 657.
Hudson, C. B. See Beaudette, F. R., jt. author, 339.
—. See also Chichester, D. F., et al., jt. authors, 613.
Hudson, R., 189.
Hübner, K., 128.
Hülphers, G., 575.
—. See also Brandt, O., jt. author, 702.
Hueper, W. C., Briggs, F. A., & Wolfe, H. D., 451.
—, Wiley, F. H., Wolfe, H. D., Ranta, K. E., Leming, M. F., & Blood, F. R., 451.
Huff, C. G., 333.
Huffman, C. F. See Duncan, C. W., et al., jt. authors, 134, 797.
—. See also Hale, E. B., et al., jt. authors, 880.
Huffman, W. T. See Shahan, M. S., et al., jt. authors, 24.
Hughes, D. L., 371.
Hughes, J. H. M., 975.
Hughes, J. S. See Aubel, C. E., jt. author, 541.
—. See also Peterson, W. J., jt. author, 785.
Hughes, T. P., Pickles, E. G., & Horsfall, F. L., Jr., 301.
Hull, H. See Branion, H. D., et al., jt. authors, 199.
Hulse, E. C. See Hole, N. H., jt. author, 531.
Hume, A. N. See Franzke, C. J., et al., jt. authors, 558.
Hungary. Rep. nat. Anim. Hlth Inst., Budapest, 1937, 727.
Hungerford, T. G., 101, 728.
—, & Hart, L., 763.

Hunt, C. H., Winter, A. R., & Bethke, R. M., 201.
Hunt, W. H. See Habermann, R. T., et al., jt. authors, 878.
—. See also Harwood, P. D., et al., jt. authors, 878.
Hunter, D. See Brock, J., jt. author, 696.
Hupbauer, A., 318, *bis*.
—, & Skoković, L., 489.
—, & Zaharija, I., 604.
Hurn, M. See Berkson, J., et al., jt. authors, 970.
Husain, M. A., 678.
Huss, R. See Kling, C., et al., jt. authors, 509.
Hutchings, B. L. See Woolley, D. W., jt. authors, 314.
Hutson, L. R., 35.
Hutt, F. B., 112.
—, Bruckner, J. H., & Cole, R. K., 773.
—. See also Lamoreux, W. F., jt. author, 466.
Hyde, R. R., 606.
Hyslop, J. A., 178.

I

Ide, H. G., Harvey, R. A., & Warren, S. L., 363.
Il'inov, S. P., 619.
Imping, E., 204.
India. Adm. Rep., Baluchistan Agency, 1937-38, 219.
—. Agric. & Anim.Husb., 1936-37, 722.
—. Proc. Anim. Husb. Res. Wkrs Conf., 1936, 307.
—. Proc. 24th Indian Sci. Cong., Hyderabad, 1937, 719.
—. Proc. 25th Indian Sci. Congr., Calcutta, 1938, 720.
—. Rep. Army vet. Serv., 1937-38, 65; 1938-39, 979.
—. Rep. Bengal vet. Coll., 1937-38, 219.
—. Rep. Bombay vet. Coll., 1937-38, 219.
—. Rep. Haffkine Inst., 1938, 760.
—. Rep. Imp. Coun. agric. Res., 1938-39, 808.
—. Rep. Pasteur Inst., Coonoor, 1938, 979.
—. Rep. Pasteur Inst., Kasauli, 1937, 894.
—. Rep. vet. Dep., Assam, 1937-38, 219.
—. Rep. vet. Dep., Bengal, 1937-38, 219.
—. Rep. vet. Dep., Bihar, 1937-38, 219.
—. Rep. vet. Dep., Bombay, 1937-38, 219.
—. Rep. vet. Dep., Cent. Prov. & Berar, 1937-38, 219.
—. Rep. vet. Dep., Hyderabad Deccan, 1936-37, 219.
—. Rep. vet. Dep., Mysore, 1937-38, 219.
—. Rep. vet. Dep., Punjab, 1937-38, 219.
—. Rep. vet. Dep., United Prov., 1937-38, 219.
Ingersoll, R. L., Winn, M., & Lindegren, C. C., 702.
Innes, J. R. M., 821.
—, Harvey, W., & Dawson, E. K., 44.
—. See also Dunlop, G., et al., jt. authors, 612.
—. See also Findlay, G. M., jt. author, 857.
—. See also Harvey, W. F., et al., jt. authors, 44.
Ioanid, V. See Nitzescu, I. I., jt. author, 955, 956.
Ionesco-Braila, G., & Dinulesco, G., 765.
Ippoliti, P. T., 17.
Ipsen, J., & Rostock, O., 939.
Irvine-Smith, J., 398.
Irving, J. T. See Griffith, H. D., et al., jt. authors, 212.
Irwin, J. O. See Barkworth, H., jt. author, 52.
Isa, J. M. See Savage, A., jt. author, 24.
Isbell, H. See Fraser, H. F., al., jt. authors, 544.
Ishii, S., 421.
—, Nakamura, N., & Nobuto, K., 421.
—. See also Nakamura, N., et al., jt. authors, 253.
Isnard, J., 382, *bis*.
Isshiki, O., & Ogata, S., 597.
Itabashi, K. See Tazima, T., et al., jt. authors, 578.
Italy. Rep. Anim. Dis. Inst., Padua, 1937, 225.
—. Rep. vet. Serv., Rome, 1929-35, 570.
Itikawa, O., 654.
Ito, S. See Tazima, T., et al., jt. authors, 578.
Ivanić, M., 20, 833.
Ivanoff, K., 186.
Ivánovics, G., 5, 819.
Iyer, S. G., 676.
—. See also Kaura, R. L., jt. author, 516.

J

Jackson, A. V. See Burnet, F. M., et al., jt. authors, 674, *bis*, 771.
Jackson, C. See Steyn, H. P., et al., jt. authors, 778.
Jackson, C. H. N., 891.
Jackson, D. A. See Blumberg, H., et al., jt. authors, 285.
Jacob, E., 331.
Jacobs, J. L., & Sommers, S. C., 770.
Jacobsohn, D. See Westman, A., jt. author, 390.
Jacobson, S. A., 860.
Jacotot, H., 88, 225, 335, 577, 839.
Jadin, J., 750.
Jänel, H., 965.
Jakimov, V. L. See Yakimoff, W. L.
Jakobowicz, R. See Bazeley, P. L., et al., jt. authors, 791.
Jamaica. Rep. Dep. Agric., 1938, 643.
James, S. P., 170.
Jamieson, S. R., 301.
Janisch, R., 573.
Janjua, N. A., 764.
Jansch, H., & Brachetka, J., 296.
Jansen, J., 91, 161.
—, & van Haselen, W. H., 579.
Janssens, P. See Bessemans, A., et al., jt. authors, 749.
Jardiniano, F. See Rivadelo, T. F., et al., jt. authors, 87.
Jármai, K., 279, 783, 952.
Jeaume, G., 526.
Jemiller, U., 296.
Jennings, D. A. See Florey, H. W., et al., jt. authors, 300.
Jennings, M. A. See Florey, H. W., et al., jt. authors, 300.
Jensen, B. H., 21.
Jensen, E. F., 924.
Jensen, H., & Tolksdorf, S., 142.
Jensen, V., & Roth, H., 523.
Jepsen, A., & Christiansen, M. J., 783.
Jerlov, S., 668, *bis*, 734, 923.
Jespersen, J., 367.
Jespersen, K. W. See Matthiesen, C. C., jt. author, 937.
de Jesus, Z., 591.
—, & Uichanco, J. B., 683.
Ježić, J., 309, 489.
—, & Kodrnja, E., 127, 421.
Jockovic, M., 63.
Jöhnk, M., 904.
Johannsen, H., 348.
Johns, C. K., 204, 549.
Johnson, D. W., & Palmer, L. S., 288.
Johnson, E. P., 781.
—, & Lange, C. J., 169.
—, Underhill, G. W., Cox, J. A., & Threlkeld, W. L., 20.
Johnson, H. W. See Miller, W. T., jt. author, 62.
Johnson, S. A., 440.
Johnson, W. T., 19.
Johnston, L. M., 653.
Johnstone, W. K., 975.
Jones, E. E. See Hinshaw, W. R., et al., jt. authors, 689.
Jones, E. R. See Carmichael, J., jt. author, 713.
Jones, G. B. See Grimmett, R. E. R., et al., jt. authors, 381.
Jones, V. B., 604.
Jonesco-Mihaesti, C., 5.
Jørgensen, M., 936.
Jourdan, F. See Sedallian, P., et al., jt. authors, 436.
J. Amer. vet. med. Ass., 13, 64, 65, 72, 123, 636.
J. Coun. sci. industr. Res. Aust., 362.
J. R. agric. Soc., 691, 766, 807.
J. S. E. agric. Coll. Wye, 565.
Joyeux, C., & Baer, J.-G., 99, 181, 347.
—, & Sautet, J., 84, 932.
Joyner, A. L. See Sabin, F. R., jt. author, 653.
Jukes, T. H., 202.
—. See also Fouts, P. J., et al., jt. authors, 202.
Julius, H. W. See Wolff, L. K., jt. author, 704.
Jullien, J., 914.
Jungherr, E., 41.
—. See also Pappenheimer, A. M., et al., jt. authors, 203.

K

van der Kaay, F. C., 300.
Kabat, E. A., 953.
—, & Furth, J., 858.
Kádár, M., 590.
Kahlfeld, F., & Wahlich, A., 68.
Kairies, A., & Koch, J., 579.
Kalisvaart, C. See Brouwer, E., et al., jt. authors, 369.
Kambosseff, S., 610.
Kamen, M. D. See Hahn, P. F., et al., jt. authors, 798.
Kamil, S., & Bilal, S., 162.
Kaminskii, F. O. See Schulz, R. E. S., jt. author, 430.
Kanne, E. M. See McCarter, J., et al., jt. authors, 687.
Kanyó, B. See Oláh, G., jt. author, 172.
Kapp, E. M., 627.
Karady, S., & Browne, J. S. L., 446.
Kardjiev, B., 449.
Kárnik, T., 651.
Karsten, 690.
Karsubova, C. See Pappenheimer, A. M., et al., jt. authors, 786.
Kassell, B. See Brand, E., et al., jt. authors, 948.
Kassem, H., 387.
Kast, G., 732.

Kato, S. See Kuwayama, S., jt. author, 29.
Katsurada, F., 261.
—, & Okino, T., 280.
Kaufmann, O., 170.
Kaura, R. L., & Iyer, S. G., 516.
Kaushal, R. S., 605.
Kauzal, G. P., 850.
Kay, H. D., Aschaffenburg, R., & Neave, F. K., 869.
Keller, 523.
Keller, H., 205, 523.
—, & Möller, H., 617.
Keller, K., 106.
Kelley, R. B., 141, 564.
—, & Dumaresq, J. A., 141.
—, & Shaw, H. E. B., 141.
Kelly, M. See Fitch, C. P., et al., jt. authors, 80.
Kelser, R. A., 728, 942.
Kenda, I., 421, 422.
Kennedy, J. A. See Barcroft, J., et al., jt. authors, 626.
Kennedy, M. See Adey, C. W., jt. author, 747.
Kennedy, W. L., Anderson, A. K., Bechdel, S. I., & Shigley, J. F., 133.
Kenya. Rep. vet. Dep., 1938, 811.
Kerby, G. P., 82.
Kernkamp, H. C. H., 90.
Kerr, P. J., 219.
Kerr, W. R. See Lamont, H. G., jt. author, 24.
Kespersen, J., & Olsen, N. J. H., 134.
Khodzhibekov, S. See Zarubkinskiĭ, V. S., jt. author, 689.
Kidson, E. B., & Maunsell, P. W., 709.
—. See also Stanton, D. J., jt. author, 366.
Kik, M. C. See Sure, B., et al., jt. authors, 369.
Kikuth, W., 126, 415.
—, & Mudrow, L., 707.
Kikuti, S., 625.
Killham, B. J., 645.
Kimura, R., & Masunaga, N., 255.
Kindyakov, V. I., 586.
—. See also Lavrovskiĭ, N. E., et al., jt. authors, 669.
King, L. S., 144, 250, *ter*, 276, 445.
King, W. S. See Hignett, S. L., jt. author, 872.
Kirgis, H. D. See Harman, M., et al., jt. authors, 545.
Kirkpatrick, A. C., 638.
Kiyono, K., & Tomita, T., 281.
Klarenbeek, A., 504.
Kleckner, A. L. See Klein, L. A., et al., jt. authors, 702.
Kleeberg, J., Gurevitch, I., & Alkan, W. J., 462.
Klein, J. R. See Kohn, H. I., et al., jt. authors, 286.
Klein, L. A., Kleckner, A. L., & Parry, R. M., 702.
Klein, W., & Broicher, C., 386.
Kleinberg, W., Gordon, A. S., & Charipper, H. A., 963.
Kleine, F. K., 166.
Klieneberger, E., 582.
—. See also Findlay, G. M., et al., jt. authors, 27, 165.
Klimmer, M., & Haupt, H., 69, 207.
Kling, C., Huss, R., & Olin, G., 509.
Klose, A. A., Almquist, H. J., & Mecchi, E., 122.
—. See also Almquist, H. J., jt. author, 122, 458, *bis*.
Klotz, L. J., 474.
Knight, B. C. J. G. See McIllwain, H., et al., jt. authors, 157.
Knipling, E. F., 96, 764.
Knoop, C. E., Krauss, W. E., & Hayden, C. C., 456.
Knowlton, G. C., Hines, H. M., & Brinkhous, K. M., 288, 787.
Knox, R., 562.
—. See also Dmochowski, L., jt. author, 609.
Koch, J. See Kairies, A., jt. author, 579.
Koch, K. R., 840.
de Kock, G., 940.
—, Robinson, E. M., & Parkin, B. S., 414.
Kodrnja, E., 422, *bis*.
—. See also Ježić, J., jt. author, 127, 421.
Köbe, K., 252.
—, & Fertig, H., 92.
Kohane, O., 969.
Kohls, G. M. See Parker, R. R., et al., jt. authors, 98.
Kohn, H. I., Klein, J. R., & Dann, W. J., 286.
Kohn, I. See Dubois, A., jt. author, 792, 793.
Kókai, M., 299.
Kolb, L. C., 42.
Kolmer, J. A., Bondi, A., Howard, M., & Rule, A. M., 657.
Kolochine-Erber, B., & Stefanopoulo, G. J., 664.
Kolodny, M. H., 166, 167, 584, 830.
Kolouch, F., Jr., 279.
Kon, S. K. See Cashell, G. T. W., jt. author, 955.
Kondi, A. See Foy, H., jt. author, 120.
Korenchevsky, V., & Ross, M. A., 968.
Korobkova, E. I., 411.
Korovetskaya, N. N., 779.
Korzenzky, J. See Hajdu, G., jt. author, 238.
Koser, S. A., Chinn, B. D., & Saunders, F., 328.
—, & Saunders, F., 328.
Kotlán, A., 351.
Kotlán, S., 247, 678.
—, & Pellérdy, L., 662.
Kovács, A., 299, 562.
Kovács, G., 954.
Kovalevskiĭ, M. F. See Laktionov, A. M., et al., jt. authors, 671.
Krage, & Tiedge, 2.
Kramer, M. M. See Harman, M., et al., jt. authors, 545.
Kraneveld, F. C., & Djaenoedin, R., 575, 706.
—, & Mansjoer, M., 574.
—, & Nasoetion, A., 256.
—, & Umboh, T. E. W., 619, 649.
Krassnoff, D., 145.
—. See also Bridré, J., jt. author, 255.
—. See also Levaditi, C., et al., jt. authors, 94.
Krause, F., 474.
Krauss, W. E. See Knoop, C. E., et al., jt. authors, 456.
Kraybill, H. R., 379.
Kreis, A., 593.
Krembs, J., 779, 944.
—, & Seifried, O., 27.
Kremsreiter, J., 579.
Kress, F., 778.
Kretchmar, H. H., 217.
Krieger, C. H. See Lowe, J. T., et al., jt. authors, 120.
Krishniengar, K., 219.
Krogh, A. See Christensen, E. H., et al., jt. authors, 550.
Krüger, F., 260.
Krull, W. H., 182.
Krupski, A., Almasy, F., & Uehlinger, E., 862, 863.
—, Uehlinger, E., & Almasy, F., 542.
Krupski, A. See also Uehlinger, E., jt. author, 535.
Kubes, V., & Ríos, F. A., 174.
Kudinov, A. F., 933.
Kühbacher, H., 794.
Küpfer, M., 647.
Kuhn, L. R., 829.
Kulakov, K. A., 499, 692, 706.
—. See also Dukalov, A. I., et al., jt. authors, 658.
Kulczycki, J. See Zagrodzki, K., et al., jt. authors, 39.
Kuppuswami, P. S., 276.
Kurchatov, V. I. See Markov, A. A., jt. author, 919.
—. See also Markov, A. A., et al., jt. authors, 919, *bis*.
Kuwayama, S., & Kato, S., 29.

L

Laake, E. W., & Smith, C. L., 28, 97.
Laanes, T. See MacDowell, E. C., et al., jt. authors, 950.
Lacassagne, A., 113.
Lackman, D. See Czarnetzky, E. J., et al., jt. authors, 313.
—. See also Mudd, S., et al., jt. authors, 313.
Lackman, D. B. See Mudd, S., et al., jt. authors, 313.
Lagerlöf, N., 361, 450.
Lagodsky, H., 917.
Lahiri, D. C., 437.
Laidlaw, P. See Dunkin, G. W., et al., jt. authors, 237.
Laigret, J., & Auburtin, P., 630.
Laing, A. D. M. G., 276.
Laja, F., 326.
Laktionov, A. M., Arkhangel'skiĭ, N. D., & Kovalevskiĭ, M. F., 671.
Laktionova, A. I. See Gambarov, G. S., jt. author, 490.
Lalas, B., 108, 277.
de Lamarlière, A., 604.
Lamarre, L., 22.
Lamborn, W. A. S., 843.
Lammert, H., 69.
Lamont, H. G., 581.
—, & Kerr, W. R., 24.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Dunkin, G. W., et al., jt. authors, 237.
—. See also Ross, I. C., et al., jt. authors, 178.
Lamoreux, W. F., & Hutt, F. B., 466.
Lancet, 62, 295, 390, 445, 618, 787, 790, 873.
Land, E., 607.
Landsberg, J. W., 33, 850.
—, & Accousti, N. J., 795.
Landy, L., 92.
Lange, C. J. See Johnson, E. P., jt. author, 169.
Langer, F., 377.
Langermann, A., 277.
Langham, R., & Hallman, E. T., 108.
—. See also Sholl, L. B., et al., jt. authors, 109.
Langner, H., 922.
Langner, P. H., Jr., & Forrester, J. S., 803.
—. See also Forrester, J. S., jt. author, 803.
Lansing, A. I., Miller, D., & Titus, H. W., 370.
Lardy, H. A. See Moxon, A. L., et al., jt. authors, 710.
Larrat, M., 805.
Larre, 22.
Larson, C. L. See Green, R. G., et al., jt. authors, 692.

László, F., 275.
Latteur, J. P., 935.
Laurencin, S. See Gavrilov, W., 499.
—. See also Gavrilov, W., et al., jt. authors, 247.
Lavier, G., 520.
Lavin, G. I. See Smadel, J. E., et al., jt. authors, 589.
Lavrent'ev, P. A., 331, 377, 502, 753.
—. See also Bogoroditskii, A. V., jt. author, 620.
—. See also Bogoroditskii, A. V., et al., jt. authors, 620.
Lavrovskii, N. E., Kindyakov, V. I., & Doronin, N. N., 669.
Lawkowicz, W., 248.
Lawrence, D. A., 633, 723.
Lawrence, E. O. See Hahn, P. F., et al., jt. authors, 696.
Lazarus, A. S., & Meyer, K. F., 517.
Lea, D. E., & Haines, R. B., 970.
Leach, C. N. See Denison, G. A., jt. author, 840.
Leach, E. H. See Carleton, H. M., jt. author, 630.
Leasure, E. E., Link, R. P., & Whitlock, J. H., 384.
—. See also Whitlock, J. H., jt. author, 684.
—. See also Whitlock, J. H., et al., jt. authors, 684.
Leathers, W. S. See Meleney, H. E., et al., jt. authors, 915.
Lebduska, J., & Pidra, J., 887.
Lebert, F., 843.
Leclainche, E., 506, *bis*, 565, *bis*.
Lee, C. D., & Wilcke, H. L., 340.
Lee, M. See Chown, B., et al., jt. authors, 859.
Legg, J., 751.
—, & White, C. T., 131.
Leitch, I., 455.
LeMasurier, H. E., & Branion, H. D., 384.
Lemberg, R., 467.
Lemetayer, E. See Ramon, G., et al., jt. authors, 39.
Leming, M. F. See Hueper, W. C., et al., jt. authors, 451.
Lemon, G. C. See Pulvertaft, R. J. V., et al., jt. authors, 620.
Lenci, E. See Boquet, A., jt. author, 821.
Lenfers, H., 58.
Lenkeit, W., & Becker, M., 195.
Leprovsky, S. See Fouts, P. J., et al., jt. authors, 202.
Lerche, 10, *bis*, 824.
Lerche, M., 54.
Leskien, J., 198.
Leslie, A., 900.
Lester, V., 75.
Lestoquard, F. See Donatien, A., jt. author, 356, 418, 503, 691, 761, 834.
—. See also Sergent, Ed., et al., jt. authors, 415, *bis*.
Letard, E., 395.
Levaditi, C., 94, *bis*, 292, 589, 958.
—, Krassnoff, D., Reinié, L., & Giuntini, J., 94.
—, Le-Van-Sen, & Reinié, L., 94.
—, & Lominski, I., 94.
—, —, Reinié, L., & Le-Van-Sen, 94.
—, & Reinié, L., 95.
—, —, & Bequignon, R., 589.
—, —, Stamatin, Le-Van-Sen, & Bequignon, R., 676.
Le-Van-Sen. See Levaditi, C., et al., jt. authors, 94, *bis*, 676.
Levenson, S., & Grabar, P., 748.
Levine, B. S., 4.
Levine, N. D., & Brandly, C. A., 168.
—. See also Graham, R., et al., jt. authors, 76, 577.
Levine, P. P., 126, 266, 347, 661, 79..
—. See also Olson, C., jt. author, 266.
Levy, E. B., 274.
Lewis, A. A., & Turner, C. W., 714.
Lewis, E. A., 427, 679.
Lewis, H. B. See Gortner, R. A., Jr., jt. author, 622.
—, Schultz, J., & Gortner, R. A., Jr., 963.
Lewis, K. H., & Hitchner, E. R., 79.
Lewis, M. R., 193.
—. See also Lewis, W. H., jt. author, 880.
—. See also Rich, A. R., et al., jt. authors, 136, *bis*.
Lewis, W. H., & Lewis, M. R., 880.
Libet, B., & Yesinick, L., 474.
Lichtenstein, M., 796.
Lichtenstern, G., 684.
Liebling, J. See Youmans, G. P., et al., jt. authors, 469.
Liebow, A. A., Burn, C. G., & Soper, W. B., 736.
Liechtenstein, G. P., 912.
Liégeois, 721.
Lightfoot, C. C. See Duncan, C. W., et al., jt authors, 134, 797.
Lima do Sacramento Pratas, A. See Aires, A. A., jt. author, 971.
Limbek, L., 355.
Lincicome, D. R. See Faust, E. C., et al., jt. authors, 394.
Lindbergh, C. A., 630.
Lindegren, C. C. See Ingersoll, R. L., et al., jt. authors, 702.
Linden, B. A. See Slocum, G. G., jt. author, 551.
Lindenberg, A., 447.
Lines, E. W. L., 115.
—. See also Bull, L. B., et al., jt. authors, 115.
Link, R. P. See Leasure, E. E., et al., jt. authors, 384.
—. See also Whitlock, J. H., et al., jt. authors, 684.
Linton, R. G., & Brownlee, A., 544.
Lionnet, F. E., 402.
Lipson, M., 876.
Lisbonne, M., 914.
—, Roman, G., & Renoux, G., 497, 581.
Lisco, H. See Wintrobe, M. M., et al., jt. authors, 862.
Litchfield, J. T., Jr., White, H. J., & Marshall, E. K., Jr., 618.
Little, G. M., 81.
Little, R. B., 2, *bis*, 71, 207.
Live, I. See Stubbs, E. L., jt. author, 72.
Lobitz, W. C., Jr. See Ebertz, E. G., jt. author, 488.
Lockett, S., 643.
Loeffler, I., 111.
Loewenthal, L. J. A., & Wilson, W. A., 146.
Logsdon, C. D., 412.
Lominski, I. See Levaditi, C., jt. author, 94.
—. See also Levaditi, C., et al., jt. authors, 94.
Long, C. N. H. See Harrison, H. C., jt. author, 712.
Long, E. R., 432.
Long, M. L. See Bischoff, F., jt. author, 200.
Long, P. H. See Marshall, E. K., jt. author, 618.
Longley, B. J., Clausen, N. M., & Tatum, A. L., 969.
Loose, F. See Siebert, W. J., jt. author, 872.
Loosli, C. G., 386.
Lorenz, F. W., 123.
Losner, S. See Dubois, A., jt. author, 793.
de Loueiro, J. A. See Grabar, P., jt. author, 631.
Lourens, L. F. D. E., 443, 479.
Lourie, E. M., & Warrington Yorke, 57.
Lovell, R., 77, 185, 358.
Lowe, J. T., Steenbock, H., & Krieger, C. H., 120.
Lucas, A. P., 160.
Ludolph, A., 61.
Lück, 249.
Lütje, 710.
Lugomer, V., 489.
Lund, A., 120.
Lunde, S., 237.
Luria, S., 920.
Lurie, M. B., 438, *bis*.
Lush, D., 538.
—. See also Burnet, F. M., et al jt. authors, 674, *bis*, 771.
—. See also Dickson, B. T., et al., jt. authors, 755.
Luy, P., 802.
Lwoff, A., 17.
Lwoff, M., & Ceccaldi, J., 329.
Lyman, R. Y. See Youmans, G. P. et al., jt. authors, 469.

M

Maas, 757.
McCallan, E. A., 722.
MacCallum, F. O. See Findlay, G. M., et al., jt. authors, 27, 165.
McCallum, J. W. See Stewart, J., jt. author, 48.
—. See also Stewart, J., et al., jt. authors, 775.
McCance, R. A., & Widdowson, E. M., 696, *bis*.
McCandlish, A. C., 114.
McCarter, J., & Hastings, E. G., 410.
—, Kanne, E. M., & Hastings, E. G., 687.
McClary, C. F., & Upp, C. W., 191.
—. See also Bearse, G. E., et al., jt. authors, 785.
McClemont, J. See Barron, N. S., et al., jt. authors, 440.
—. See also Davis, J. G., jt. author, 229.
McClure, F. J. See Mitchell, H. H., jt. author, 284.
Maccolini, R. See Ramon, G., et al., jt. authors, 39.
McCollum, E. V. See Day, H. G., jt. author, 284.
MacCorquordale, D. W., McKee, R. W., Binkley, S. B., Cheney, L. C., Holcomb, W. F., Thayer, S. A., & Doisy, E. A., 458.
McCoy, O. R., 351.
McCulloch, E. C. See St. John, J. L., et al., jt. authors, 964.
McCulloch, R. N., 719.
McDearman, S. See Sprunt, D. H., jt. author, 716.
McDonald, I. W. See Marston, H. R., jt. author, 115, *bis*.
McDonald, J. G., 966.
McDonald, J. R., Schlotthauer, C. F., & Bollman, J. L., 450.
—. See also Schlotthauer, C. F., et al., jt. authors, 859.
McDougall, J. C., 219.
McDougle, H. C. See Durant, A. J., jt. author, 782.

MacDowell, E. C., 950.
—, Potter, J. S., Richter, M. N., Victor, J., Bovarnick, M., Taylor, M. J., Ward, E. N., Laanes, T., & Wintersteiner, M.P., 950.
McEuen, C. S., 194, *bis.*
McEwen, A. D., 81, 323, 565, 580, 827, 913.
—, & Oxspring, G. E., 580.
—, Priestley, F. W., & Paterson, J. D., 80.
Macfarlane, R. G., 563.
Macfie, J. M., Bacharach, A. L., & Chance, M. R. A., 787.
McGuire, G. See Siegel, L., et al., jt. authors, 457.
—. See also Truhlar, J., et al., jt. authors, 469.
Macheboeuf, M., & Mandoul, R., 264, 595.
McHenry, E. W. See Maclean, D. L., et al., jt. authors, 615.
Machioni, I., 685.
Machul'skiĭ, S. N. See Yakimov, V. L., et al., jt. authors, 918.
McIllwain, H., Fildes, P., Gladstone, G. P., & Knight, B. C. J. G., 157.
Macindoe, R. H. F. See McLennan, G. C., et al., jt. authors, 947.
McIntosh, I. G. See Grimmett, R. E. R., jt. author, 381.
—. See also Grimmett, R. E. R., et al., jt. authors, 381.
McIntosh, J. See Selbie, F. R., jt. author, 609.
McIntosh, R. A., 174.
McIntyre, G., 89.
Mackay, J. See Moffat, A. B., jt. author, 549.
McKee, R. M. See Doisy, E. A., et al., jt. authors, 547.
—. See also MacCorquordale, D. W., et al., jt. authors, 458.
McKenna, C. T. See McLennan, G. C., et al., jt. authors, 947.
McKenney, F. D., 497.
Mackenzie, R. D. See Findlay, G. M., et al., jt. authors, 27, 165.
Mackenzie, W. J. E., 725.
McKercher, D. G. See Mitchell, C. A., et al., jt. authors, 124, 174.
Mackerras, I. M. See Dickson, B. T., et al., jt. authors, 755.
Mackey, A. K. See Pearson, P. B., et al., jt. authors, 614.
McKim, O. E., 634.
Mackintosh, J. See Bartlett, A., et al., jt. authors, 283.
Maclean, D. L., Sheppard, M., & McHenry, E. W., 615.
Maclean, M. E. See Broadhurst, J., et al., jt. authors, 516.
McLennan, G. C., Macindoe, R. H. F., & McKenna, C. T., 947.
MacLeod, C. M., Mirick, G. S., & Curnen, E. C., 806.
MacLeod, J., 179, *bis.*
McLeod, J. W. See Abdalla, N. W., jt. author, 817.
McLeod, W. M., & Wagers, R. P., 143.
Macnab, E. See Foggie, A., jt. author, 327.
McNaught, K. J., & Paul, G. W., 365.
—. See also Bonner, W. G., et al., jt. authors, 197.
McNutt, S. H., Schwarte, L. H., & Eveleth, D. F., 392.
—, & Walsh, F. E., 855.
McOmie, W. A. See Cameron, H. S., jt. author, 938.
McPhee, H. C., & Buckley, S. S., 779.
Macrae, T. F., & Edgar, C. E., 867.
—. See also Chick, H., et al., jt. authors, 956.
—. See also Edgar, C. E., jt. author, 867.
—. See also Edgar, C. E., et al., jt. authors, 867, *bis.*
—. See also el Sadr, M. M., et al., jt. authors, 867.
Madagascar. Rep. Pasteur Inst., Antananarivo, 1938, 897.
Madden, F. J. See Blumer, C. C., et al., jt. authors, 119.
Madden, R. J. See Axelrod, A. E., et al., jt. authors, 456.
Madden, S. C., & Whipple, G. H., 797.
Madhusudan, A. R. See Nair, K. S., et al., jt. authors, 670.
Madsen, D. E., & Nielsen, H. M., 695.
—. See also Nielsen, H. M., jt. author, 784.
Madsen, H., 635.
Madsen, L. L., & Davis, R. E., 544.
—. See also Ellis, N. R., jt. author, 784.
Magath, T. B., 216.
—. See also Berkson, J., et al., jt. authors, 970.
Maggiora-Vergano, R., 7.
Magill, T. P., & Francis, T., Jr., 931.
Magnusson, H., 587, 670, 910.
—. See also Forssman, J., jt. author, 668.
Magyar, M., 300.
Mahajan, M. R., 285, 584.
Mahal, H. S., 962.
Mahlau, E. See Piening, C., jt. author, 550.
Maier, E., 179.
Maignon, F., 602.
—, & Thiery, J. P., 437.
Malaya. Rep. vet. Deps., 1938, 894.
Malbrant, R., 663, *bis.*, 772.
—, Bayrou, M., & Rapin, P., 915.
—. See also Saleun, G., et al., jt. authors, 584.
Malevich, J. J. See Murashkintsev, N. S., jt. author, 263.
Malik, M. I., 219.
Malkani, P. G., 585, *bis.*
Malta. Rep. Br. melitensis Res. Sta., 1939, 496.
Maltaner, E. See Wadsworth, A., et al., jt. authors, 434.
Maltaner, F. See Wadsworth, A., et al., jt. authors, 434.
Malterre, Ginièis, Guérillot, & Berthaud, 563.
Mandoul, R., 30, 264, 595.
—. See also Macheboeuf, M., jt. author, 264, 595.
Mangrulkar, M. Y., 413.
Mann, F. C. See Hester, H. R., et al., jt. authors, 802.
Manning, P. D. V. See Stokstad, E. L. R., jt. author, 201, 458.
Manninger, R., 105, 173, 252, 360, 424, 727.
Manohar, K. D., 315.
Mansjoer, M. See Kraneveld, F. C., jt. author, 574.
Manthei, C. A. See Eichhorn, E. A., jt. author, 172.
Manville, I. A., 213.
Manville, I. R. See Sullivan, N. P., jt. author, 242, *bis.*
Manwell, R. D., & Goldstein, F., 125, 833.
Marble, D. R., 773, 774.
Marchal, S., Paturel, L., & Guérin, P., 453, *bis.*
Marchoux, E., Chorine, V., & Crougue, O., 835.
Marcis, A., & Pintér, P., 271.
Marcusson, E., 686, 744, *bis.*
Marek, J., Wellmann, O., & Urbányi, L., 198, *bis*, 199, 298, 366, 784.
Margolis, G., Margolis, L. H., & Smith, S. G., 200.
Margolis, L. H. See Margolis, G., et al., jt. authors, 200.
Marinov, I. See Pop, A., et al., jt. authors, 241.
Markevičius, A., 161.
Markov, A. A., Abusalimov, N. S., & Kurchatov, V. I., 919.
—, & Kurchatov, V. I., 919.
—, —, & Dzasokhov, G. S., 919.
—. See also Skryabin, K. I., et al., jt. authors, 342.
Marković, D., 421, *bis.*
Marrack, J. R., 435.
Marsh, H., & Wilkins, H. W., 83.
—, & Wilson, E. P., 534.
Marshall, E. K., & Long, P. H., 618.
Marshall, E. K., Jr., 210.
—. See also Litchfield, J. T., Jr., et al., jt. authors, 618.
Marshall, I. H. See Remp, D. G., jt. author, 52.
Marston, A. T. See Belding, D. L., jt. author, 483.
Marston, H. R., 115, *bis.*
—, & McDonald, I. W., 115, *bis.*
—. See also Bull, L. B., et al., jt. authors, 115.
Martin, A. E. See Fairbrother, R. W., jt. author, 426.
Martin, A. J. P., & Moore, T., 547.
Martin, C. R. A., 571.
Martin, G. J., 454.
Martin, H. M., 42.
Martin, J. F., Ball, V., Dechaume, J., & Collet, P., 860.
Martin, J. H. See Carpenter, C. D., jt. author, 112.
Martin, L. See Flament, R., jt. author, 514.
Martin, L. A. See Bridré, J., jt. author, 926.
Marx, W. See Sprunt, D. H., et al., jt. authors, 589.
Mason, E. M. See Griffith, H. D., et al., jt. authors, 212.
Mason, H. C., 122.
—, & Smith, M. E., 49.
Mason, J. H., & Alexander, R. A., 503.
Mason, K. E., & Bryan, W. L., 786.
Mason, M. F. See Barcroft, J., et al., jt. authors, 626.
Massé, J., 176.
Masunaga, N. See Kimura, R. jt. author, 255.
Mather, D. W. See Green, R. G., et al., jt. authors, 692.
Matheson, R., 648.
Matschoulsky, S. N. See Yakimoff, W., jt. author, 19, *bis.*
Matthews, C. A. See Swett, W. W., et al., jt. authors, 140, 605, 949.
Matthiesen, C. C., & Jespersen, K. W., 937.
Matzke, M., 162.
Maunsell, P. W. See Kidson, E. B., jt. author, 709.
Mauritius. Rep. Dep. Agric., 1937, 402.
Maxted, W. R. See Colebrook, L., jt. author, 703.
May, H. B., & Buck, S. C., 790.
Mecchi, E. See Klose, A. A., et al., jt. authors, 122.
de Medeiros, J. L., 7.
Medlar, E. M., 734.
Medlemsbl. danske Dyrlaegeforen., 668.

Megyaszai, G., 324, 586.
Meilman, E. See Subbarow, Y., et al., jt. authors, 50.
van Meirhaeghe, A. See Bessemans, A., et al., jt. authors, 749.
Meisters, N., 367.
Meleney, F. L. See Zaytzeff-Jern, H., jt. author, 124.
Meleney, H. E., Frye, W. W., & Leathers, W. S., 915.
Mellanby, E., 96, 197, 974.
Mellanby, K., 97.
de Mello, F. de F. P., 218.
Mel'nikov, D. D. See Gusev, V. F., et al., jt. authors, 917.
Melvin, R., & Bushland, R. C., 343.
de Mendonça Machado, A., 819.
Menefee, E. E., Jr., & Poston, M. A., 294.
Mengle, H. A. See Bower, J. O., et al., jt. authors, 56.
Menk, W., 838.
Menkin, V., 607.
Menon, P. G., 530.
Menzani, C. See Bardelli, F., jt. author, 916.
Menzel, A. E. O., & Heidelberger, M., 9.
Menzies-Kitchin, A. W., 856.
Merchant, I. A., 701.
Mercier, P., 4.
—. See also Ramon, G., et al., jt. authors, 38.
Merling-Eisenberg, K. B., 564, *bis*.
Merzdorf, G., 878.
Mesrobeanu, L. See Boivin, A., jt. author, 39.
Messerli, W. See Frauchiger, E., jt. author, 675, *bis*.
Metivier, H. V. M., 725.
Mettam, R. W. M., 132, 639.
—, & Ford, J., 511.
Metzger. See Buck, jt. author, 752.
Metzger, H. J., Beaudette, F. R., & Stokes, F. R., 630.
—, & Morrison, H. B., 783.
Meunier, P., & Raoul, Y., 455, 614.
Meyer, E., 670.
Meyer, K., 74, 239.
Meyer, K. F., & Eddie, B., 677, *bis*.
—, —, & Yanamura, H., 272.
—. See also Lazarus, A. S., jt. author, 517.
Meymandi, M. See Darraspen, E., et al., jt. authors, 606.
Meyrieux, M., 688.
de Meza, J., 478.
Michaelis, L., 64.
—, & Smythe, C. V., 147.
Michel, H. O., & Harris, J. S., 467.
Michel-Béchet, R., Puig, R., & Charvet, P., 648.
Mider, G. B., & Morton, J. J., 282.
Miègeville, J., & Zottner, G., 928.
Mikacić, D., 349.
—. See also Erlich, I., jt. author, 346.
Miklashevskiĭ, V. N. See Polyakov, I. A., jt. author, 443.
Miles, A. A., 15.
—, & Pirie, N. W., 15, 356, 746.
—, —, & Philpot, J. St. L., 746.
Miles, D. W. See Gay, F. P., et al., jt. authors, 461.
Milks, H. J., 646.
Miller, D. See Lansing, A. I., et al., jt. authors, 370.
Miller, D. H., 494.
Miller, E. W. See Pybus, F. C., jt. author, 536.
Miller, M. R. See Fleming, C. E., et al., jt. authors, 131.
Miller, V. L. See Bearse, G. E., et al., jt. authors, 785.
Miller, W. C., & Day, F. T., 470.
Miller, W. C. See also Scorgie, N. J., jt. author, 557.
Miller, W. T., & Johnson, H. W., 62.
—, Murdock, F. M., & Heishman, J. O., 703.
—, & Williams, K. T., 964.
Millikan, G. A., 467.
Mills, A. M. See Hardenbergh, J. G., jt. author, 913.
Mills, C. A. See Colvin, J. W., jt. author, 606.
Mills, M. A., & Colwell, C. A., 410.
Minett, F. C., 1, 487, *bis*, 948.
—. See also Dunkin, G. W., et al., jt. authors, 237.
Minn. Wildlife Dis. Invest., 444, *quin*.
Minnich, V. See Moore, C. V., et al., jt. authors, 696.
Mino, P., 504.
Mirick, G. S. See MacLeod, C. M., et al., jt. authors, 806.
Mitchell, A. G. See Nelson, W. E., et al., jt. authors, 354.
Mitchell, C. A., Walker, R. V. L., & McKercher, D. G., 124, 174.
—, —, & Plummer, P. J. G., 174.
Mitchell, D. T., 639.
Mitchell, H. H., & McClure, F. J., 284.
Mitscherlich, E., 824.
Mochida, I., 738.
Mócsy, J., & Szélyes, L., 187.
Möhlmann, H., 757.
Möller, H. See Keller, H., jt. author, 617.
Mönnig, H. O., 180.
Moffat, A. B., & Mackay, J., 549.
Moglia, G., 57.
Mohler, J. R., 269, 897.
Mohler, W. M., 323.
Molina, A., 840.
Moliter, H., Robinson, H., & Graessle, O., 873.
Mollaret, P., & Bonnefoi, A., 664.
Møller, R., & Thomsen, A., 838.
Monceaux, R. H., 199.
Monroe, C. F., & Perkins, A. E., 628.
Montefiore. See Bonnet, H., et al., jt. authors, 101, *bis*.
Monteiro da Costa, A., 515.
Montgomerie, R. F., & Thomson, A., 267, *bis*.
de Monyé, G. A. M., 674.
Moore, C. V., Arrowsmith, W. R., Quillan, J. J., & Read, J. T., 696.
—, Doan, C. A., & Arrowsmith, W. R., 696.
—, Minnich, V., & Welch, J., 696.
Moore, G. R. See Roberts, S. J., jt. author, 339.
Moore, H. O., 115.
Moore, L. A., 456.
Moore, T. See Martin, A. J. P., jt. author, 547.
Moore, W. See Hendrick, J., jt. author, 342.
—. See also Ross, I. C., et al., jt. authors, 178.
Mooser, H., 302.
Morenas, L. See Mouriquand, G., jt. author, 546.
Morgan, D. O., & Corner, H. H., 768.
—, & Wilson, J. E., 596.
Morgan, D. R. See Cantarow, A., et al., jt. authors, 376.
Morgan, E., 57, 432, 532.
Morgan, H. R., & Beckwith, T. D., 11.
Morgan, I. M. See Czarnetzky, E. J., et al., jt. authors, 313.
—. See also Mudd, S., et al., jt. authors, 313.
Morista, T., 85.
Morocco. Rep. milit. vet. Res. Lab., 1938, 896.
—. Rep. Res. Lab. Livestk Serv., 1938, 727.
Morozov, S. D., & Polkovnikova, R. S., 556.
Morrill, C. C., 189, 411.
Morris, J. P. A., 150, 642.
Morris, M. L. See Russell, W. C., jt. author, 286.
Morris, S., & Ray, S. C., 117, 137.
Morrison, H. B. See Metzger, H. J., jt. author, 783.
Morton, H. E., 329, 475.
Morton, J. J. See Mider, G. B., jt. author, 282.
Moschkowitz, L., & Sprinz, H., 610.
Mossige, K. See Danbolt, N., jt. author, 83.
Motiejunas, J., 213.
de Moulin, F. W. K., 748.
Moulis, M., 172.
Mouriquand, G., 48, 285.
—, & Morenas, L., 546.
Moutaux, 277, 856.
Moxon, A. L., 296.
—, Olson, O. E., & Searight, W. V., 380.
—, Schaefer, A. E., Lardy, H. A., Dubois, K. P., & Olson, O. E., 710.
Moynahan, E. J., 888, *bis*.
Mudd, S., Czarnetzky, E. J., Lackman, D., & Pettit, H., 313.
—, Pettit, H., Lackman, D. B., & Morgan, I. M., 313.
—. See also Czarnetzky, E. J., et al., jt. authors, 313, *bis*.
—. See also Wells, W. F., et al., jt. authors, 397.
Mudrow, L. See Kikuth, W., jt. author, 707.
Müller, W. See Schreiber, W., jt. author, 186.
Münich, J., 471.
Muenscher, W. C., 156.
Müssemeier, 439, 506.
—, & Gaede, 725.
Mulhearn, C. R. See Rudd, J. A., jt. author, 150.
Mulligan, H. W., 979.
Mundhenk, R. L., & Greene, J. E., 525.
Muntwyler, E. See Myers, V. C., jt. author, 540.
von Muralt, A., 302.
Murashkintsev, N. S., & Malevich, J. J., 263.
Muratov, E. A., & Alkashev, D. N., 581.
Murdoch, F. M. See Miller, W. T., et al., jt. authors, 703.
Murnane, D., 115.
—. See also Bull, L. B., et al., jt. authors, 115.
Murphy, J. M., 229.
Murphy, W. A., & Duerschner, D. R., 7.
Murray, C., 633.
Murray, C. A., 722.
Murray, M., 114.
Murray, M. M. See Glock, G. E., et al., jt. authors, 454.
Murthy, K. S., 410.
Muto, K., 132.
Myburgh, S. See Quin, J. I., et al., jt. authors, 967.
Myers, G. N., 623.
Myers, V. C., & Muntwyler, E., 540.
Myhill, B. A., 399, 605.

N

Nabholz, A., 217.
Nagano, Y., 519.

Nagano, Y. See also Stefanopoulo, G. J., jt. author, 256, *bis*.
Naghski, J. See Slanetz, L. W., jt. author, 817.
Nagy, A. H., 74.
Nagy, D., 438.
Naik, R. N., 575.
Nain. See Cauchemez, et al., jt. authors, 847.
Nair, K. S., Ayyar, D. H., & Madhusudan, A. R., 670.
Nakamura, N., Ishii, S., & Watanabe, S., 253.
—. See also Ishii, S., et al., jt. authors, 421.
Nasoetion, A. See Kraneveld, F. C., jt. author, 256.
Natvig, L. R., 590.
Navarro Brazão, L. See Palmeiro, J. M., jt. author, 351.
Neave, F. K. See Kay, H. D., et al., jt. authors, 869.
Neitz, W. O., 958, *bis*.
—, & du Toit, P. J., 498.
Nelson, A. A., 543, 553.
Nelson, J. B., 26.
—. See also Ten Broeck, C., jt. author, 948.
Nelson, P. M., 168.
Nelson, W. E., Mitchell, A. G., & Brown, E. W., 354.
Németh, I., 12.
Nevot, A. See Urbain, A., et al., jt. authors, 937.
Nevskiĭ, I. N., 549.
New Zealand. Rep. Dep. Agric., 1938-39, 723.
—. Rep. Dep. sci. industr. Res., 1936-37, 64.
Nichita, G., 139.
—, Tuschak, N., & Popesco, I., 864.
Nichols, M. S., 297.
Nichols, R. E., 392.
Nickel, R., & Gisske, W., 395.
Niclas, A., 550.
Nicolau, S., 301.
—, & Ravelo, A., 332.
Nicolaus, W., 130, 965.
Nicolle, P., & Simons, H., 415.
Nieberle, 372.
van Niekerk, J., & Franken, F., 51.
—, & Hofstra, H., 699.
Nielsen, F. W., & Plum, N., 820.
Nielsen, H. M., & Madsen, D. E., 784.
—. See also Madsen, D. E., jt. author, 695.
Niemeyer, W. E., 40.
—. See also Hinshaw, W. R., et al., jt. authors, 689.
Nieschulz, O., 660.
—, & Bos, A., 248.
—, —, & Frickers, J., 329.
Nigeria. Rep. vet. Dep., 1937, 568, 639.
Nijs, J. See Gavrilov, W., jt. author, 970.
Nisi, T., 731.
Nitzescu, I. I., & Ioanid, V., 955, 956.
Nobata, R., 718.
—. See also Umeno, S., jt. author, 393.
Noble, R. L. See Drummond, J. C., et al., jt. authors, 546.
Nóbrega, P., & Reis, J., 823.
—. See also Cardoso, D. M., et al., jt. authors, 874.
—. See also Reis, J., jt. author, 935.
Nobuto, K. See Ishii, S., et al., jt. authors, 421.
Nodgren, G., 145.
Norris, L. C., & Bauernfeind, J. C., 613.
—. See also Gallup, W. D., jt. author, 118.
Northern Rhodesia. Rep. vet. Dep., 1937, 150, 151; 1938, 642, 643.
Nouvel, J. See Urbain, A., jt. author, 131, 909.
—. See also Urbain, A., et al., jt. authors, 22, 906.
Novel, E., 473.
Nowicki, E., 245.
Nusser, I., 938.
Nyasaland. Annu. med. Rep., 1938, 843.
—. Rep. vet. Dep., 1938, 478.
Nyiredy, I., 214.

O

Oag, R. K., 243, *bis*, 462.
Oberling, C., & Guérin, M., 452, *bis*.
Obitz, E., & Wadowski, S., 58.
O'Connor, R. C. See Florey, H. W., et al., jt. authors, 300.
O'Dea, A. F., 440.
Odom, V. See Faust, E. C., et al., jt. authors, 394.
Oehlkers, H. See Schoop, G., jt. author, 168.
Oehnell, R., 236.
Oeller, 837.
Oesterlin, M., 260.
—. See also Bock, E., jt. author, 717.
Ogata, S. See Isshiki, O., jt. author, 597.
Ogilvie, R. F., 571.
Ogneru, D. See Pop, A., jt. author, 167.
Ohasi, M., 431.
Ohman, A. F. S., 129.
van Oijen, C. F., 291.
Ojemann, J. G., 374.
Okabe, K., 592.
Okino, T. See Katsurada, F., jt. author, 280.
Oklješa, B. See Tomašec, I., jt. author, 688.
Okuno, Y. See Tazima, T., et al., jt. authors, 578.
Olafson, P., 911.
Olafsson, A., 274, 596.
Oláh, G., 93.
—, & Kanyó, B., 172.
Oleson, J. J. See Bird, H. R., et al., jt. authors, 955.
—. See also Kegsted, D. M., et al., jt. authors, 202.
—. See also Phillips, P. H., et al., jt. authors, 869.
Olin, G., 238.
—. See also Kling, C., et al., jt. authors, 509.
Oliphant, J. W. See Perrin, T. L., jt. author, 841.
Olitsky, P. K., 763.
—, & Harford, C. G., 925.
Olivier, H. R. See Bonét-Maury, P., jt. author, 909.
Olsen, N. J. H. See Kespersen, J., jt. author, 134.
Olson, C., & Goetchius, G. R., 738.
—, & Levine, P. P., 266.
Olson, O. E. See Moxon, A. L., et al., jt. authors, 380, 710.
Olson, T. M., 854.
Olsson, E., 531.
Olsuf'ev, N. G., 411.
Olver, A., 218.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Dunkin, G. W., et al., jt. authors, 237.
—. See also Henry, M., et al., jt. authors, 278.
Onstott, R. H. See Sebrell, W. H., et al., jt. authors, 201.
Oppel, E., 923.
Opper, L., 200.
Oppermann, M., 364.
Oppermann, T., 107, 921.
Orinsbee, R. A., 332.
Orlov, I. V., 348, 844.
—. See also Skryabin, K. I., et al., jt. authors, 342.
Orlov, N. P., Alikaev, V. A., Prieselkov, A. M., Rodionov, V. G., Gur'eva, A. M., & Samartsev, A. S., 768.
Orr, J. See Dalling, T., et al., jt. authors, 112.
Országh, O., & Alföldy, J., 601.
Ortlepp, R. J., 768.
Osgood, E. E., 124.
—, & Brownlee, I. F., 705.
Osteen, O. L. See Gochenour, W. S., et al., jt. authors, 125.
Oswald, B., 344, 421, 767.
Otero, P. M., & González, L. M, 688.
Otte, W., 61, 142.
Otto, G. F., & Abrams, E., 686.
Outhouse, E. L. See Forbes, J. C., jt. author, 622.
Overbeek, A. A., 318.
Oxspring, G. E. See McEwen, A. D., jt. author, 580.
Oyama, T. See Tazima, T., et al., jt. authors, 578.
van Oyen, C., 372.

P

Pabijanskas, A., 603.
Packalén, T., 157.
Packchanian, A., 85, 830.
Packer, D. M. See Scott, G. H., jt. author, 716.
Pagel, W., 653.
Painter, E. See Gregersen, M. I., jt. author, 135.
Palestine. Rep. Dep. Agric., 1938-39, 810.
—. Rep. Dep. Hlth, 1938, 724.
Palmeiro, J. M., & Navarro Brazão, L., 351.
Palmer, L. S. See Johnson, D. W., jt. author, 288.
Panisset, L., 249, 837.
—, & Dauvois, L., 103.
Papageorgiu, S., 170.
Papantonakis, E., 832.
Papp, G., 251.
Pappenheimer, A. M., 700.
—, Goettsch, M., & Jungherr, E., 203.
—, —, & Karsubova, C., 786.
Pappenheimer, A. M., Jr. See Porter, E. F., jt. author, 433.
Paraf, J., 226.
Paranjothy, J. T., 789.
Parish, H. E., & Cushing, E. C., 28.
—. See also Cushing, E. C., jt. author, 97.
Parish, H. J. See Bigger, J. W., et al., jt. authors, 804, 886.
Parker, R. R., Kohls, G. M., Cox, G. W., & Davis, G. E., 98.
Parkin, B. S. See de Kock, G., et al., jt. authors, 414.
Parlier, 513.
Parnes, J., 252.
Parr, L. W., 78.
Parrot, L. See Sergent, Ed., et al., jt. authors, 415, *bis*.
Parrott, E. M. See Hogan, A. G., jt. author, 543.
Parry, R. M. See Klein, L. A., et al., jt. authors, 702.
Parsons, C. H. See Weil, A. J., jt. author, 433.
Parsons, T. R., 404.
Pasquier, M. A., 560.

Paterson, J. D., 655.
—. See also McEwen, A. D., et al., jt. authors, 80.
Paterson, J. S., 325.
Paturel, L. See Marchal, S., et al., jt. authors, 453, *bis.*
Paul, G. W. See Bonner, W. G., et al., jt. authors, 197.
—. See also McNaught, K J., jt. author, 365.
Pauli-Magnus, 84.
Pavlov, P., 163, 244.
Pavšič, M., 277.
Peacock, H. A., 901.
Pearce, J. M., 427.
Pearce, L., 463.
Pearson, B., & Casey, A. E., 537.
—. See also Casey, A. E., jt. author, 537.
Pearson, P. B., 121.
—, Schmidt, H., & Mackey, A. K., 614.
Peatt, E. S. W., 604.
Peck, E. F., 477, 707.
Peck, R. L. See Anderson, R. J., et al., jt. authors, 822.
Pedretti, L., 258.
—. See also Spann, J., jt. author, 258.
Pégo, F. See Antunes Tropa, E., jt. author, 346.
Peirce, A. W., 464.
Pellérdy, L. See Kotlán, S., jt. author, 662.
Penderi, G., 625.
Penna, H. A., 630.
Pennell, R. B. See Huddleson, I. F., jt. author, 527.
—. See also Stahl, W. H., et al., jt. authors, 657.
Pennington, D. See Snell, E. E., et al., jt. authors, 786.
Penso, G., 15.
Peragallo, I. See Ramon, G., et al., jt. authors, 39.
Peres, C. See Faust, E. C., et al., jt. authors, 394.
Perkins, A. E. See Monroe, C. F., jt. author, 628.
Perrin, T. L., & Oliphant, J. W., 841.
Perrineau, G. See Aubertin, E., jt. author, 320.
Persons, E. L. See Harvey, H. I., et al., jt. authors, 867.
Peterkin, G. A. G., 671.
Peters, R. A., 383.
Petersen, C. B., 504.
Petersen, G., 506.
Petersen, G. H., 644.
Petersen, P. J., 296.
Peterson, V. E. See Houchin, O. B., et al., jt. authors, 135.
Peterson, W. J., & Hughes, J. S., 785.
—. See also Whitnah, C. H., et al., jt. authors, 785.
Petragnani, G., 526.
Petrov, A. M., & Gagarin, V. G., 430.
—. See also Skryabin, K. I., et al., jt. authors, 342.
Pettit, H. See Czarnetzky, E. J., et al., jt. authors, 313.
—. See also Mudd, S., et al., jt. authors, 313, *bis.*
Peyton, W. T. See Green, R. G., et al., jt. authors, 861.
Pfaff, G., 758.
Pfeffer, A. See Seelemann, M., jt. author, 36, 580.
Pfeiffer, K., 128.
Philippe, J., & Sissoko, M., 335.
Philipsz, G. L. C. See Veeraraghavan, N., jt. author, 760.
Phillip, C. B., 428.
—. See also Curasson, jt. author, 420.
Phillipe, 710.
Phillips, J. H., 350.
Phillips, P. H., & Engel, R. W., 287, 866.
—, Rupel, I. W., Oleson, J. J., & Bohstedt, G., 869.
—. See also Engel, R. W., jt. author, 287, 369.
—. See also Engel, R. W., et al., jt. authors, 699.
Philp, R. C. T., Dumaresq, J. A., & Wilson, R. J., 784.
Philpot, J. St. L. See Miles, A. A., et al., jt. authors, 746.
Piasecka-Zeyland, E., 737.
—, & Zeyland, J., 492.
Picard, F. H. J., & Bakker, T., 613.
Pickering, J. P., 604.
Pickles, E. G. See Hughes, T. P., et al., jt. authors, 301.
Pickup, J., 49.
Pidra, J. See Lebduska, J., jt. author, 887.
Piening, C., 911.
—, & Mahlau, E., 550.
Pieritz, 879.
Piérot, 508.
Piérot, M., 508.
Pierpont, R. L., 794.
Pierre, 629.
Pierre, M., 143.
Pigoury, 225.
Pikkarainen, J., 9.
Pincus, G., & Werthessen, N. T., 216.
Pinkerton, H., 488.
Pintér, P. See Marcis, A., jt. author, 271.
Pires, F. A., 916.
Pirie, J. H. H., 325.
Pirie, N. W. See Miles, A. A., jt. author, 15, 356, 746.
—. See also Miles, A. A., et al., jt. authors, 746.
van der Plank, G. M., 612.
Plantureux, E., 588.
Plastridge, W. N., Anderson, E. O., Williams, L. P., & Weirether, F. J., 231.
Platen, J., 905.
Platt, A. E., 494.
Plum, N., 159, 268.
—. See also Nielsen, F. W., jt. author, 820.
Plummer, P. J. G., 176.
—. See also Mitchell, C. A., et al., jt. authors, 174.
Pochon, J., 628.
—. See also Cotoni, L., jt. author, 4.
Poindexter, H. A., 414.
Poisson, J. See Blanchard, L., et al., jt. authors, 363.
Polding, J., 496.
Policard, A., & Velu, H., 444.
Polkovnikova, R. S. See Morozov, S. D., jt. author, 556.
Polonovski, M., & Briskas, S., 196, *bis.*
Polson, A., 836.
Polyakov, I. A., & Miklashevskiĭ, V. N., 443.
Poncet, A. See Sergent, Ed., jt. author, 585.
Ponsford, A. P. See Stewart, W. L., jt. author, 520, 856.
Pop, A., Damboviceanu, A., Marinov, I., & Barber, C., 241.
—, & Ogneru, D., 167.
Popesco, I. See Nichita, G., et al., jt. authors, 864.
Popescu-Baran, M., 598.
Popovici, I., & Diuligher, T., 514.
Porter, A., 682.
Porter, D. A., 523, 849.
—. See also Christensen, J. F., jt. author, 246.
Porter, E. F., & Pappenheimer, A. M., Jr., 433.
Porter, J. R., & Hale, W. M., 957.
—, & Rettger, L. F., 784.
Portschy, O., 459.
Pospelova-Shtrom, M. V., 429.
Poston, M. A. See Menefee, E. E., Jr., jt. author, 294.
Potter, J. S. See MacDowell, E. C., et al., jt. authors, 950.
—. See also Victor, J., jt. author, 951.
Potts, M. K., 273.
Pou, M. C., Viera, O., Calzada, V., & García, J. A. R., 415, 686.
Poulton, W. F., 401.
Poult. Sci., 452.
Powell, J. See Black, D. A. K., et al., jt. authors, 796.
Prag. tierärztl. Arch., 922.
Prat, J., 108, 250.
Prescott, J. A. See Dickson, B. T., et al., jt. authors, 755.
Preuner, R., 241.
Prévot, A. R., 164.
Price, S. A. See Smith, M. L., jt. author, 157, *bis.*
Prickett, C. O., Salmon, W. D., & Schrader, G. A., 615.
—, & Stevens, C., 393.
—. See also Schrader, G. A., jt. author, 615.
Prieselkov, A. M. See Orlov, N. P., et al., jt. authors, 768.
Priestley, F. W., 553.
—. See also McEwen, A. D., et al., jt. authors, 80.
Priestley, H. See Dickson, B. T., et al., jt. authors, 755.
Prieto, C. See Grosso, A. M., 251.
Prokopanoff, A., 21.
Proske, H. O., & Watson, R. B., 501.
Provost, A. See Roubaud, E., jt. author, 414, 660.
Prudhomme. See Cauchemez, et al., jt. authors, 847.
Publ. Hlth Rep., Wash., 519, 891.
Puhr, L. F. See Franzke, C. J., et al., jt. authors, 558.
Puig, R. See Michel-Béchet, R., et al., jt. authors, 648.
Pullar, E. M., 130, 522, 874.
Pulles, H. A., 24.
Pulvertaft, R. J. V., Lemon, G. C., & Walker, J. W., 620.
Purchase, H. S., 781.
—. See also Dalling, T., et al., jt. authors, 112.
Purdy, W. J. See Amies, C. R., et al., jt. authors, 280.
Putnam, T. J., 564.
Pybus, F. C., & Miller, E. W., 536.
Pyl, G., 921.
Pyman, F. L., 959.

Q

Quillan, J. J. See Moore, C. V., et al., jt. authors, 696.
Quin, A. H., 695.
Quin, J. I., 194.
—, & van der Wath, J. G., 967.
—, —, & Myburgh, S., 967.
Quinlan, J. See Steyn, H. P., et al., jt. authors, 778.
Quortrup, E. R. See Coburn, D. R., jt. author, 242.

R

Radley, J. A., & Grant, J. 647.
Raevskiĭ. See Uspenskiĭ, et al., jt. authors, 733.
Rajagopalan, V. R., 611.
—, & Gopalaskrishnan, V. R., 411.
Rajčević, M., 772.

Rake, G., 37.
Rambe, L., 379.
Ramon, G., 600.
—, Bocage, A., Boivin, A., Mercier, P., Richou, R., & Defrance, M., 38.
—, Lemetayer, E., Richou, R., Maccolini, R., Djourichitch, M., Peragallo, I., & Rouchdi, M., 39.
—, & Richou, R., 527.
Ramos, J. I. See Torres, S., jt. author, 19.
Ramsey, E. W., 394.
Randall, R., 926.
Ranta, K. E. See Hueper, W. C., et al., jt. authors, 451.
Rao, M. A. N., 32, 682.
Raoul, Y. See Meunier, P., jt. author, 455, 614.
Raoult, A., 166.
Rapin, P. See Malbrant, R., et al., jt. authors, 915.
Rasch, K., 549, 616.
Rastegar, R. See Richou, R., jt. author, 376.
Ratomski, A., 578.
Ratter, A. See Craig, J. F., jt. author, 947.
Ravelo, A. See Nicolau, S., jt. author, 332.
Ray, J. D., & Whipple, G. E., 760.
Ray, S. C., 468.
—. See also Morris, S., jt. author, 117, 137.
Read, J. T. See Moore, C. V., et al., jt. authors, 696.
Records, E. See Vawter, L. R., jt. author, 188.
Rec. Méd. vét., 870, *bis*.
Redmond, W. B., 501.
Reed, C. I., 288.
—, Struck, H. C., & Steck, I. E., 730.
Rees, C. W., 662.
—, & Garlick, G. G., 661.
—, & Underwood, P. C., 416.
Reeves, J. L. See Behrens, C. A., et al., jt. authors, 515.
Rehmet, J., 119.
Reichel, J., 105.
Reichenow, E., 502, 828.
Reid, J., 820.
Reid, W. M., Ackert, J. E., & Case, A. A., 32.
Reimann, S. P., & Toennies, G., 875.
Reinfel'd, A. K., 559.
Reinié, L. See Levaditi, C., jt. author, 95.
—. See also Levaditi, C., et al., jt. authors, 94, *ter*, 589, 676.
Reis, J., & Nobrega, P., 935.
—. See also Cardoso, D. M., et al., jt. authors, 874.
—. See also Nobrega, P., jt. author, 823.
Reiser, R., 286.
Reitsma, P. See Brouwer, E., et al., jt. authors, 369.
Remlinger, P., & Bailly, J., 424, 514, *bis*, 673, *bis*, 841, 928, *bis*.
Remp, D. G., & Marshall, I. H., 52.
Renoux, G., 656.
—. See also Lisbonne, M., et al., jt. authors, 497, 581.
Reports. See under name of country.
Rettger, L. F., 740.
—. See also Porter, J. R., jt. author, 784.
Reuszer, H. W. See Barr, C. G., et al., jt. authors, 624.
Rev. zootéc., 234.
Revnivykh, A. G., 654.
Revo, M. V., 904.
Rev. Méd. vét., Toulouse, 890.
Rev. vét. milit., 224, 225, 308, *bis*.
Reynolds, F. H. K. See Stone, W. S., jt. author, 585.
Reynolds, S. R. M., & Foster, R. I., 472.
Rhodes, A. J., & van Rooyen, C. E., 536.
Rhod. agric. J., 399.
Rich, A. R., & Follis, R. H., Jr., 552, 705.
—, & Hamilton, J. D., 543.
—, Lewis, M. R., & Wintrobe, M. M., 136.
—, Wintrobe, M. M., & Lewis, M. R., 136.
—. See also Follis, R. H., Jr., jt. author, 873.
Richards, A. N., 138.
Richardson, A. P., 879.
Richardson, F. L., 330.
Richardson, U. F., 243, 585.
Richet, C., & Antoine, C., 749.
Richou, R., & Rastegar, R., 376.
—. See also Ramon, G., jt. author, 527.
—. See also Ramon, G., et al., jt. authors, 38, 39.
Richter, H. A., 670.
Richter, M. N. See MacDowell, E. C., et al., jt. authors, 950.
Richters, C. E., 485.
Ridala, V., 91, *bis*, 426.
Rider, D. L., 621.
Rider, J. R., 769.
Riedmüller, L., 777.
Riet, J., 165.
Rievel, 206.
Rigdon, R. H., 71, 315, 437.
Rigg, T., 114.
Riley, W. A., 182.
Rimington, C., 627, 966.
—, & Hemmings, A. W., 374.
Rimpau, W., 579.
Rinjard, P., 441.
—, Gratiolet, G., & Chabot, C., 587.
Ríos, F. A. See Kubes, V., jt. author, 174.
Rist, N., 321, 375.
—, Bloch, F., & Hamon, V., 375, 909.
Ristorcelli, M., 332.
Rita, G., 255.
Rittenberg, D. See Schoenheimer, R., jt. author, 799.
Ritzman, E. G., 881.
—, & Benedict, F. G., 729.
Ritzmann, J. See Goettsch, M., jt. author, 700.
Rivadelo, T. F., Vytiaco, P., & Jardiniano, F., 87.
Ro, M. See Yokogawa, S., jt. author, 556.
Roach, S. A., 152.
Roberts, E., Severens, J. M., & Card, L. E., 739.
Roberts, E. H. See Harwood, P. D., et al., jt. authors, 878.
Roberts, F. H. S., 31, 877.
Roberts, S. J., & Moore, G. R., 339.
Robertson, D., 680, 844.
Robertson, H. E., 608.
Robertson, R. C., 678.
Robin, V., & Charton, A., 295.
Robinow, C. F. See Bland, J. O. W., jt. author, 339.
Robinson, E. M. See de Kock, G., et al., jt. authors, 414.
Robinson, H. See Molitor, H., et al., jt. authors, 873.
Robinson, W., & Baker, F. C., 28.
Robles, M. M., 927.
—. See also Topacio, T., et al., jt. authors, 927.
Robson, J. M., 390.
Roch, M., 302.
Rodhain, J., 660.
Rodionov, V. G. See Orlov, N. P., et al., jt. authors, 768.
Roe, R. J., 809.
Röhrer, H., 904.
—, & Stenert, H., 205.
Roemmele, O., 419.
Roepke, M. H., & Fitch, C. P., 718, 852.
Rösgen. See Schrader, jt. author, 649.
Roets, G. C. S., 752.
Rogers, H. J. See Davis, J. G., jt. author, 1, 314.
Rogick, F. A., 86.
Roginski, Z. See Zochowski, P., et al., jt. authors, 494.
Rolle, M., 164.
Roman, E., 682.
Roman, G. See Lisbonne, M., et al., jt. authors, 497, 581.
Romaña, C., 601.
Ronchèse, A.-M., 717.
Roos, J., 789.
van Rooyen, C. E. See Rhodes, A. J., jt. author, 536.
Rosenbusch, C. T., & Shope, R. E., 761.
Rosenbusch, F., 587.
Rosenow, E. C., 519.
Rosenthal, S. M., 553.
—. See also Bauer, H., jt. author, 552.
Rosenthal, S. R., 154.
Ross, I. C., Hobson, R. P., Moore, W., Henry, M., du Toit, P. J., Hopkirk, C. S. M., Lamont, H. G., & Whitty, J. D., 178.
Ross, I. S., 43.
Ross, J. F. See Hahn, P. F., et al., jt. authors, 798.
Ross, M. A. See Korenchevsky, V., jt. author, 968.
Rossi, P., 605, *bis*.
—, & Saunié, L. M., 658.
Rossman, E. See Holtz, F., jt. author, 142.
Rostek, F., 885.
Rostock, O. See Ipsen, J., jt. author, 939.
Roth, H., 524, 598.
—. See also Jensen, V., jt. author, 523.
Rothbard, S., & Herman, J. R., 191.
Rothermundt, M., & Burschkies, K., 792.
Roubaud, E., 350.
—, & Colas-Belcour, J., 349.
—, & Provost, A., 414, 660.
Rouchdi, M. See Ramon, G., et al., jt. authors, 39.
Roumaillac, P., 624.
le Roux, G., 420, 671, 759, 925.
—, & Gillon, A., 77.
—, & Tran-Ngoc-Hoan, 420.
le Roux, P. L., 151, 643.
Rowland, S. J., & Zein-el-Dine, M., 229, *bis*.
—. See also Zein-el-Dine, M., jt. author, 229.
Rowlands, A., 290.
Rowlands, I. W., & Young, F. G., 389.
Rowlands, W. T., 278.
Rubbo. See Dickson, B. T., et al., jt. authors, 755.
Rudd, J. A., 567, 920.
—, & Mulhearn, C. R., 150.
Rukavina, J. See Wertheim, P., jt. author, 261.
Rule, A. M. See Kolmer, J. A., et al., jt. authors, 657.
Rullier, G. See Fernbach, E., jt. author, 822.
Rumpl, L., 175.

Rupel, I. W. See Phillips, P. H., et al., jt. authors, 869.
Rusch, H. P. See Baumann, C. A., jt. author, 281.
Russell, W. See Chichester, D. F., et al., jt. authors, 613.
Russell, W. C., 48.
—, & Morris, M. L., 286.
Ruys, A. C., 906.
Ryksen, W. J., 100.
Ryle, J. A., 242.
Ryu, E., 393, *bis*, 472, 562.

S

Sabin, A. B., 582, 663.
Sabin, F. R., & Joyner, A. L., 653.
van Saceghem, R., 126, 707.
—, & Caccavella, 420.
Sachweh, P., 826.
el Sadr, M. M., Macrae, T. F., & Work, C. E., 867.
—. See also Chick, H., et al., jt. authors, 956.
—. See also Edgar, C. E., et al., jt. authors, 867.
Sahai, L., 177.
Sahlstedt, V., 803.
—. See also Christensen, E. H., et al., jt. authors, 550.
Saifi, M. F. See Vaughan, J. M., jt. author, 607.
St. John, J. L., McCulloch, E. C., Sotola, J., & Todhunter, E. N., 964.
Salafranca, E. See Topacio, T., et al., jt. authors, 927.
Salaman, M. H., 256.
Salamon, E. See Besredka, A., jt. author, 969.
Salchert, F. W., 719.
Sales, E. K. See Sholl, L. B., et al., jt. authors, 109.
Saleun, G., Malbrant, R., & Bayron, M., 584.
Salisbury, L. F., & Anderson, R. J., 263.
Salisch, H., 523.
Salles, A., 92.
Salles, P. See Bertrand, I., et al., jt. authors, 450.
Salmon, W. D. See Prickett, C. O., et al., jt. authors, 615.
Salsbery, C. E., 425.
Salyaev, V. S. See Skryabin, K. I., et al., jt. authors, 342.
Sálvi, G., 756.
Samartsev, A. S. See Orlov, N. P., et al., jt. authors, 768.
Samim, V., 569.
Samter, M. See Wintrobe, M. M., et al., jt. authors, 862.
San Agustin, G., 359.
Sandberg, I., 870.
Sanders, D. A., 43.
Sanders, M., 836.
Sang, J. H., 263.
Sangster, G. A., 640.
Sant'Anna, J. F., 681.
Saphir, O., 45.
—. See also Blahd, M., et al., jt. authors, 46.
Sarwar, S. M., 165.
Sassenhoff, I., 557.
Satterfield, G. H. See Holmes, A. D., et al., jt. authors, 865.
Saunders, F. See Koser, S. A., jt. author, 328.
—. See also Koser, S. A., et al., jt. authors, 328.
Saunders, J. E., 109.
Saunié, L. M. See Rossi, P., jt. author, 658.
Sautet, J. See Joyeux, C., jt. author, 84, 932.
Savage, A., & Isa, J. M., 24.
Sawitz, W., 184.
—. See also Faust, E. C., et al., jt. authors, 394.
Sawyer, C. E. See Hamilton, C. M., jt. author, 953.
van der Schaaf, A., 746, 936.
—, & van Zwieten, M., 650.
Schaaf, J., & Scherle, H., 168.
—, & Schmitt, H., 501.
Schaefer, A. E. See Moxon, A. L., et al., jt. authors, 710.
Schäfer, W., 9, 236, 853.
Schaefer, W. See Cabasso, V., et al., jt. authors, 908.
Schäper, W., 42.
Schaible, P. J. See Bandemer, S. L., et al., jt. authors, 709.
Schalk, A. F. See Edgington, B. H., jt. author, 90.
Schalm, O. W., & Haring, C. M., 62.
Scheer, C., 974.
Schellner, H., 37.
Schenck, M., 279.
Scherle, H. See Schaaf, J., jt. author, 168.
Schermer, S., 611.
Schern, K., 294, 874.
Schilling, C., 828.
Schlossberger, H., 210.
Schlotthauer, C. F., 107.
—, McDonald, J. R., & Bollman, J. L., 859.
—. See also McDonald, J. R., et al., jt. authors, 450.
Schmaltz, R., 836.
Schmid, F., 183, 934.
Schmidt, H. See Pearson, P. B., et al., jt. authors, 614.
Schmidt, S., 836.
Schmidt, W., 447, 938.
Schmitt, H. See Schaaf, J., jt. author, 501.
Schneider, H., & Steenbock, H., 613.
Schneider, J. See Decourt, P., et al., jt. authors, 126.
Schneider, L. See Gözsy, B., jt. author, 177.
Schoch, A., 762.
Schoenaers, F. See van Goidsenhoven, C., jt. author, 239, 330, 408.
Schoenheimer, R., & Rittenberg, D., 799.
Schoening, H. W., 758.
Schofield, F. W., 173.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Henry, M., et al., jt. authors, 278.
Schofield, R. H. See Dickinson, E. M., jt. author, 377.
Schoop, G., 32, 393, 455.
—, & Oehlkers, H., 168.
—, & Stolz, A., 958.
Schortinghuis, J., 1.
Schour, I., 863.
Schrader, & Rösgen, 649.
Schrader, G. A., & Prickett, C. O., 615.
—. See also Prickett, C. O., et al., jt. authors, 615.
Schramm, W., 215.
Schreiber, W., & Müller, W., 186.
Schroeder, C. R. See Winer, J. H., jt. author, 694.
Schroeder, F., 777.
Schröter, H. F., 442.
Schüffner, W., 504.
Schultz, J. See Lewis, H. B., et al., jt. authors, 968.
Schultz, O., 560.
Schultze, M. O., 560.
Schulz, K., 754.
Schulz, R. E. S., & Kaminskii, F. O., 430.
Schulze, H. G., 780.
Schumacher, A., 968.
Schumacher, A. E., & Heuser, G. F., 866.
Schutze, H., 293, 528.
Schwabacher, H., & Wilson, G. S., 322.
—. See also Wilson, G. S., jt. author, 9.
Schwarte, L. H., 134.
—. Eveleth, D. F., & Biester, H. E., 623.
—. See also Biester, H. E., jt. author, 162.
—. See also Biester, H. E., et al., jt. authors, 44.
—. See also Eveleth, D. F., jt. author, 175.
—. See also McNutt, S. H., et al., jt. authors, 392.
Schwartz, B., 205.
Schwartz, E., 932.
Schweider, L. B. See Behrens, C. A., et al., jt. authors, 515.
Schweitzer, M. D., & Furth, J., 192.
Schweiz. med. Wschr., 302.
Science, 463.
Scorgie, N. J., 463.
—, & Miller, W. C., 557.
Scott, G. H., & Packer, D. M., 716.
Scott, W. J. See Haines, R. B., jt. author, 702.
Searight, W. V. See Moxon, A. L., et al., jt. authors, 380.
Sebrell, W. H., Onstott, R. H., Fraser, H. F., & Daft, F. S., 201.
—. See also Daft, F. S., jt. author, 543.
Sedallian, P., Jourdan, F., & Clavel, C., 436.
Seegar, G. E. See Gey, G. O., et al., jt. authors, 390.
Seegers, W. H. See Brinkhous, K. M., et al., jt. authors, 135.
Seekles, L., 371.
Seelemann, M., & Pfeffer, A., 36, 580.
—, & Siemonsen, K., 207, 488.
—, & Wolf, C. H., 36.
Seghetti, L. See Howarth, C. R., jt. author, 71.
Seibert, F. B., & DuFour, E. H., 687, 770.
Seideman, R. M., 184.
Seifried, O., 40, 49, 864.
—. See also Dobberstein, J., jt. author, 949.
—. See also Krembs, J., jt. author, 27.
Seit, B., 666.
Selbie, F. R., & McIntosh, J., 609.
Selvaggi, F., 25.
Selye, H., & Folgia, V. G., 385.
Sen, K. C., 365.
Sen, P., 429.
Sen, S. K., 961.
Senever, G., 259.
Senyushkina, V. P. See Yakimov, V. L., et al., jt. authors, 918.
Sergent, Ed., 308.
—, Donatien, A., Parrot, L., Lestoquard, F., & Delpy, L., 415, *bis*.
—, & Poncet, A., 585.
Sergent, Em., Fourestier, M., & Galliano, E. J., 347.
Severens, J. M. See Roberts, E., et al., jt. authors, 739.
Severinghaus, A. E., & Thompson, K. W., 715.
Sevilla, N. S., 701.
Seyfarth, M., 180, 778.
Shaffer, P. A., 461.
Shah, S. M. A., 804.
Shahan, M. S., Giltner, L. T., Davis, C. L., & Huffman, W. T., 24.

Shahi, H. B., 943.
Shanks, P. L., 357, 461.
Sharp, D. G., 489.
Sharpe, G. C. H., 893.
Shaw, H. E. B. See Kelley, R. B., jt. author, 141.
Shearer, G. D. See Dunlop, G., et al., jt. authors, 612.
Sheldon, A. J. See Brown, H. W., jt. author, 686.
Shelling, D. H. See Blumberg, H., et al., jt. authors, 285.
Sheppard, M. See MacLean, D. L., et al., jt. authors, 615.
Sherwood, R. M., 118.
Shigley, J. F. See Kennedy, W. L., et al., jt. authors, 133.
Shillinger, J. E., 428, 774.
Shirlaw, J. F., 512, 531.
Sholl, L. B., 109.
—, Sales, E. K., & Langham, R., 109.
Shook, W. B., & Bunyea, H., 10.
Shope, R. E., 516, 761, *bis*, 771.
—. See also Rosenbusch, C. T., jt. author, 761.
Shorb, D. A., 593.
Shortt, H. E., 247.
Shtriter, V., 657.
Shyrock, E. H., 969.
Sidor, K. See Zagrodzki, K., et al., jt. authors, 39.
Siebert, W. J., & Loose, F., 872.
Siegel, L., Allen, R. M., McGuire, G., & Falk, K. G., 457.
Siemonsen, K. See Seelemann, M., jt. author, 207, 488.
Sierra Leone. Rep. Dep. Agric., 1937, 152.
Silberberg, M., & Silberberg, R., 715, 967.
Silberberg, R. See Silberberg, M., jt. author, 715, 967.
Silverman, I. J. See Wiener, A. S., jt. author, 602.
Simmons, S. W., 257.
Simonnet, H., 139.
Simons, H. See Nicolle, P., jt. author, 415.
Sinev, A. V., 623.
Singh, B., 510, 757.
Sinkó, F., 287.
Sissoko, M. See Philippe, J., jt. author, 335.
Sitsen, A. E., 312.
Sittner, G., 280.
Sjöberg, K., 541.
Sjollema, B., 47, 198, 284, 367.
—, Danckwortt, P. W., & Hotzel, J., 198.
Sjollema, P. See Veenbaas, A. H., jt. author, 293.
Skarić, J., 327.
Skinner, C. E., 581.
Skoković, L. See Hupbauer, A., jt. author, 489.
Skryabin, K. I., Petrov, A. M., Orlov, I. V., Markov, A. A., Tsaprun, A. A., & Salyaev, V. A., 842.
Slanetz, L. W., & Naghski, J., 317.
Slavin, G., 838.
Slocum, G. G., & Linden, B. A., 551.
Smadel, J. E., Lavin, G. I., & Dubos, R. J., 589.
Smith, A. M. See Greig, J. R., et al., jt. authors, 117.
Smith, C. L. See Laake, E. W., jt. author, 28, 97.
Smith, C. N. See Bishopp, F. C., jt. author, 260, 428.
Smith, D. T. See Harvey, H. I., et al., jt. authors, 867.
Smith, E. R. B., 872.
Smith, H. E. See Cotton, W. E., et al., jt. authors, 912.
Smith, H. P. See Brinkhous, K. M., et al., jt. authors, 135.*
Smith, J., 123.
Smith, J. A., 703.
Smith, J. H., 602.
Smith, J. M., 810.
Smith, K. M., 900.
Smith, M. E. See Mason, H. C., jt. author, 49.
Smith, M. I., 129.
—, Westfall, B. B., & Stohlman, E. F., 58.
Smith, M. L., 939.
—, & Price, S. A., 157, *bis*.
Smith, M. M. See Steenken, W., Jr., jt. author, 216.
Smith, P. E. See Wintersteiner, O., jt. author, 388.
Smith, P. K. See Hoff, H. E., et al., jt. authors, 624.
Smith, R. O. A., 93, 894.
Smith, R. W., 739.
Smith, S. G. See Margolis, G., et al., jt. authors, 200.
Smith, W., 249.
—. See also Andrewes, C. H., jt. author, 173.
Smithburn, K. C., 321, 409.
Smitmans, H., 599.
Smythe, C. V. See Michaelis, L., jt. author, 147.
Snell, A. M. See Clark, R. L., et al., jt. authors, 289.
Snell, E. E., Pennington, D., & Williams, R. J., 786.
Sniečkiene, P., 534.
Snook, L. C., 696.
—. See also Fraser, A. H. H., et al., jt. authors, 540.
Snyman, P., & Thomas, A. D., 672.
Söntgen, K., 352.
Sokhey, S. S., 760.
Solandt, D. Y. See Best, C. H., jt. author, 692.
Soldini, 18.
Soldini, M., 500.
Sollier, N. See Dubois, C., jt. author, 271.
Sonazawa, K. See Yosikawa, M., jt. author, 876.
van Someren, V. D., 553.
Sommers, S. C. See Jacobs, J. L., jt. author, 770.
Soni, B. N. 590, *bis*, 932.
—. See also Chadha, S. R., jt. author, 178.
Soper, W. B. See Liebow, A. A., et al., jt. authors, 736.
Sordelli, A., 939.
Sotola, J. See St. John, J. L., et al., jt. authors, 964.
South Australia. Rep. Inst. med. vet. Sci., 1938-39, 892.
Southall, J., 804.
Southerby, R. See Symes, C. B., jt. author, 521.
Southern Rhodesia. Rep. Chief vet. Surg., 1937, 893; 1938, 399.
—. Rep. Dis. vet. Res., 1938, 723.
Spalina, 947.
Spann, J., & Pedretti, L., 258.
Speert, H., 552.
Spicer, W. J., & Dove, W. E., 97.
Spindler, L. A., 31, 211, 353.
—, & Cross, S. X., 352.
Splatt, B. See Bazely, P. L., et al., jt. authors, 791.
Sprinson, D. B. See Baumann, E. J., jt. author, 119.
Sprinz, H. See Moschkowitz, L., jt. author, 610.
Sprunt, D. H., & McDearman, S., 716.
—, Marx, W., & Beard, J. W., 589.
Spurlock, G. M. See Craig, R., jt. author, 301.
Srivastava, H. D., 682, 844, 846, 849, 933, 935, *bis*.
Stableforth, A. W., 1, *bis*.
—. See also Dunkin, G. W., et al., jt. authors, 237.
Stackhouse, J. E. See Branion, H. D., et al., jt. authors, 199.
Staehelin, R., 302.
Stäter, E. J., 610.
Stahl, W. H.; Pennell, R. B., & Huddleson, I. F., 657.
Stamatescu, S., & Sturdza, L., 903.
Stamatin. See Levaditi, C., et al., jt. authors, 676.
Stamatin, L. See Stamatin, N., jt. author, 907.
Stamatin, N., 74.
—, & Bloch, F., 73.
—, & Stamatin, L., 907.
—. See also Boquet, A., jt. author, 72.
Standfuss, R., 291.
Stanley, W. M., 664.
Stanton, D. J., & Kidson, E. B., 366.
Steck, I. E. See Reed, C. I., et al., jt. authors, 730.
Steck, W., 70, *bis*, 207, 292.
Steenbock, H. See Lowe, J. T., et al., jt. authors, 120.
—. See also Schneider, H., jt. author, 613.
Steenken, W., Jr., & Smith, M. M., 216.
—. See also Heise, F. H., jt. author, 321.
—. See also Kolochine-Erber, B., jt. author, 664.
Stefanopoulo, G. J., & Nagano, Y., 256, *bis*.
Stein, A. F. See Blatt, M. L., et al., jt. authors, 841.
Stein, C. D. See Gochenour, W. S., et al., jt. authors, 125.
Stencl, F., 395.
Stenert, H. See Röhrer, H., jt. author, 205.
Stenius, R., 160.
Stepalkin, P. P., 654.
Steuer, W., 824.
Stevens, C. See Prickett, C. O., jt. author, 393.
Stevenson-Hamilton, J., 476.
Stewart, D. F., 488, 731, 825.
—. See also Hindmarsh, W. L., et al., jt. authors, 163.
Stewart, H. L., & Cantarow, A., 376.
—. See also Cantarow, A., et al., jt. authors, 376.
—. See also Tocantins, L. M., jt. author, 953.
Stewart, J., Gordon, W. S., & McCallum, J. W., 775.
—, & Holman, H. H., 713.
—, & McCallum, J. W., 48.
Stewart, J. L., 307, 707.
Stewart, M. A., 621.
—. See also Cameron, H. S., jt. author, 685.
Stewart, S. E., 914.
Stewart, W. L., 30, 520.
—, & Ponsford, A. P., 520, 856.
Steyn, D., 383.
Steyn, D. G., 711, 796.
—, & Bekker, P. M., 130.
Steyn, H. P., Quinlan, J., & Jackson, C., 778.
Stimpert, F. D., 665.
Stohlman, E. F. See Smith, M. I., et al., jt. authors, 58.
Stokes, F. R. See Metzger, H. J., et al., jt. authors, 630.
Stokstad, E. L. R., & Manning, P. D. V., 201, 458.

Stoll, N. R., 182, *bis*.
—. See also Glaser, R. W., jt. author, 265.
Stolz, A. See Schoop, G., jt. author, 958.
Stone, W. S., & Reynolds, F. H. K., 585.
—, & Thompson, A. T., 969.
Street, J. A. See Gay, F. P., et al., jt. authors, 461.
Streng, K. O., 908.
Stroh, G., 924.
Strong, L. C., 621.
Strong, R. P., 753.
Struck, H. C. See Reed, C. I., et al., jt. authors, 730.
Strynadka, N. J., & Thornton, H. R., 52.
Stuart, H. O. See Delaplane, J. P., jt. author, 473, *bis*.
Stubbs, E. L., 693.
—, & Live, I., 72.
Stunkard, H. W., 263.
Sturdza, L. See Stamatescu, S., jt. author, 903.
Subbarow, Y., Dann, W. J., & Meilman, E., 50.
—. See also Dann, W. J., jt. author, 370.
Sudan. Rep. vet. Serv., 1938, 400.
Süle, G., 191.
Suer, W. J. See Fischer, M. H., jt. author, 135.
Sulkin, S. E., & Willett, J. C., 255.
Sullivan, E. R. See Dienes, L., jt. author, 582.
—. See also Yoffey, J. M., jt. author, 256.
Sullivan, N. P., & Manville, I. R., 242, *bis*.
Suom. Eläinlääkäril., 67.
Sure, B., Kik, M. C., Buchanan, K. S., Harrelson, R. T., Jr., & Theis, R. M., 369.
—, Theis, R. M., Harrelson, R. T., & Farber, L., 193.
Sutlić, A., 298, *bis*.
Suurballe, A., 666, *ter*.
Swaminathan, S. R., 455.
Swangard, W. M., 167, 330.
Swartzwelder, J. C., 915.
Sweden. Rep. civ. vet. Dep., 1937, 152; 1938, 645.
Swett, W. W., Matthews, C. A., & Graves, R. R., 140, 605, 949.
Swift, H. F., & Brown, T. M., 582.
Sym, E. A., 137.
Symes, C. B., & Southerby, R., 521.
Syverton, J. T., & Berry, G. P., 758.
Szabó, A., 72.
Szabó, J., 299, 562.
Szélyes, L. See Mócsy, J., jt. author, 187.
Szőke, D., 627.
Szundy, L., 783.

T

Tagand, R., & Tisseur, 147.
Takahashi, Y., 232, 316.
Taliaferro, L. G. See Taliaferro, W. H., jt. author, 832.
Taliaferro, W. H., 85.
—, & Taliaferro, L. G., 832.
Tannenbaum, A., 608.
—. See also Cohn, D. J., et al., jt. authors, 556.
Tappeiner, S., 256.
Tarnaala, K., 870.
Tate, P. See Bishop, A., et al., jt. authors, 247.
Tatum, A. L. See Longley, B. J., et al., jt. authors, 969.
Taylor, A. W., 14.
Taylor, E. L., 180, 264, 596, 635, 769.
—. See also Horton-Smith, C., jt. author, 246.
Taylor, J. See Elkington, G. W., et al., jt. authors, 788.
Taylor, L. W., & DeOme, K. B., 128.
Taylor, M. J. See MacDowell, E. C., et al., jt. authors, 950.
Taylor, W., 934.
Tazima, T., Ito, S., Okuno, Y., Oyama, T., & Itabashi, K., 578.
Teal, J. See Chown, B. et al., jt. authors, 859.
Tehver, J., 714.
Teixeira de Carvalho, G. See Vaz, Z., jt. author, 178.
Teklińska, M. See Zochowski, P., et al., jt. authors, 494.
Telford, I. R., Emerson, G. A., & Evans, H. M., 202, 289.
—. See also Evans, H. M., et al., jt. authors, 289.
Ten Broeck, C., & Nelson, J. B., 948.
Tenhaeff, C., & Ferwerda, S., 767.
Ten Thije, J., 535.
Teodoreanu, N. I., 395.
Teorell, T., 627.
Terache, P., 542.
Terada, B. See Hiyeda, K., jt. author, 58.
Terent'ev, P. S. See Gusev, V. F., et al., jt. authors, 917.
Terroine, E. F., 982.
Thalhimer, W. See Cohn, D. J., et al., jt. authors, 556.
Thapar, G. S., 681.
Thayer, S. A. See Doisy, E. A., et al., jt. authors, 547.
—. See also MacCorquordale, D. W., et al., jt. authors, 458.
Theis, R. M. See Sure, B., et al., jt. authors, 193, 369.
Theodor, O. See Adler, S., et al., jt. authors, 917.
Thieffry, S. See Bonnet, H., et al., jt. authors, 101, *bis*.
Thiele, K., 432.
Thiéry, J. P. See Maignon, F., jt. author, 437.
—. See also Urbain, A., et al., jt. authors, 937.
Thiery, M. See Chrétien, M., jt. author, 22.
Thiessen, K. H., 36.
Thieulin, G., 889.
Thijn, J. W., 945.
Thjøtta, T. See Bøe, J., et al., jt. authors, 498.
Thomas, A. D. See Snyman, P., jt. author, 672.
—. See also Thorburn, J. A., jt. author, 905.
Thomas, B. H. See Underbjerg, G. K. L., et al., jt. authors, 546.
Thomas, J. F. H., 855.
Thomas, M., 52.
Thomas, R. G., 115.
Thompson, A. T. See Stone, W. S., jt. author, 969.
Thompson, K. W. See Severinghaus, A. E., jt. author, 715.
Thomsen, A. See Møller, R., jt. author, 838.
Thomsen, K. G., 907.
Thomsen, O., 171.
Thomson, A. See Montgomerie, R. F., jt. author, 267, *bis*.
Thomson, A. P., 294.
Thomson, S., 3, 529.
Thomson, W. See Fraser, A. H. H., et al., jt. authors, 540.
Thorburn, J. A., & Thomas, A. D., 905.
Thornton, H., 975.
Thornton, H. R. See Strynadka, N. J., jt. author, 52.
Thorp, F., Jr. See Barr, C. G., et al., jt. authors, 624.
Thorp, W. T. S., & Hallman, E. T., 187.
Thorpe, M. V. See Bishop, A., et al., jt. authors, 247.
Thorshaug, K., 679.
Threlkeld, W. L. See Johnson, E. P., et al., jt. authors, 20.
Thumann, E., 526.
Thygesen, J. P. N., 928.
Tiedge. See Krage, jt. author, 2.
Tilley, F. W., 393, 475.
Tiraferri, E., 73.
Tisseur. See Tagand, R., jt. author, 147.
Titrud, L. A. See Green, R. G., et al., jt. authors, 861.
Titus, H. W. See Lansing, A. I., et al., jt. authors, 370.
Tobie, J. See Faust, E. C., et al., jt. authors, 394.
Tocantins, L. M., & Stewart, H. L., 953.
Todd, E. W., 817, *ter*.
Todhunter, E. N. See St. John, J. L., et al., jt. authors, 964.
Todoroff, A., 421.
Todorovitch, K., 79.
Toennies, G. See Reimann, S. P., jt. author, 875.
Törzök, P., 12.
du Toit, P. J., 87, 343, 439.
—, & Alexander, R. A., 441.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Henry, M., et al., jt. authors, 278.
—. See also Neitz, W. O., jt. author, 498.
—. See also Ross, I. C., et al., jt. authors, 178.
Tokura, N., 63.
Tolksdorf, S. See Jensen, H., jt. author, 142.
Tomašec, I., & Oklješa, B., 688.
Tomita, T. See Kiyono, K., jt. author, 281.
Toole, H., 32.
Topacio, T., 77, 493, 513.
—, Robles, M. M., Coronel, A. B., & Salafranca, E., 927.
Topping, N. H., 884.
—. See also Fraser, H. F., et al., jt. authors, 544.
Torres, S., 266.
—, & Ramos, J. I., 19.
Torti, E. See Ficola, G., jt. author, 570.
Tóth, A., 87, 177.
Toupaïtch, M., 765.
Toussieng, E., 666, 924.
Trager, W., 592.
Tran-Ngoc-Hoan. See le Roux, G., jt. author, 420.
Trautmann, A., 285.
—, & Asher, T., 213.
Travis, B. V., Goodwin, M. H., Jr., & Gambrell, E., 170.
Trefeu, P., 38.
Treffenstädt, W., 290.
Trimble, C. J., & Brothwood, W. C. V., 291.
Trinidad & Tobago. Rep. Dep. Agric., 1938, 725.
Tripp, F. See Holmes, A. D., et al., jt. authors, 865.
Troup, A. G., Adams, R., & Bedson, S. P., 426.
Truhlar, J., Drekter, L., McGuire, G., & Falk, K. G., 469.
Trum, B. F., 795.
Tsaprun, A. A. See Skryabin, K. I., et al., jt. authors, 342.
Tulloch, W. J., 204.

Tumanskiĭ, V. M., 411.
T'ung, T. See Chung, H., jt. author, 273.
Tunisia. Rep. Livestock Serv., 1938, 896.
Tunkl, B., 408.
Tunnicliff, R., 704, 882.
Turbet, C. R., 297.
Turley, L. A., & Dougherty, T. F., 821.
Turner, C. W. See Houchin, O. B., et al., jt. authors, 135.
—. See also Lewis, A. A., jt. author, 714.
Turner, F. C., 113.
Turner, P. R., 239.
Turner, T. B., & Brayton, N. L., 631.
—, & Fleming, W. L., 631.
Tuschak, N. See Nichita, G., et al., jt. authors, 864.
Tweed, W., 641.
Twiehaus, M. J. See Bushnell, L. D., et al., jt. authors, 646, 773.
Twisselmann, N. M., 214.
—. See also Beach, J. R., jt. author, 364.

U

Udall, D. H., 645.
Uehlinger, E., & Krupski, A., 535.
—. See also Krupski, A., et al., jt. authors, 542, 862, 863.
Uganda. Rep. vet. Dep., 1938, 401.
Uhlenhaut, F. A., 167.
Uhlenhuth, P., 302, 504.
Uichanco, J. B. See de Jesus, Z., jt. author, 683.
Ulsø, H., 128.
Umboh, T. E. W. See Kraneveld, F. C., jt. author, 619, 649.
Umbreit, W. W., 83.
Umeno, S., 3.
—, & Nobata, R., 393.
Underbjerg, G. K. L., Thomas, B. H., & Cannon, C. Y., 546.
Underhill, G. W. See Johnson, E. P., et al., jt. authors, 20.
Underwood, P. C., & Harwood, P. D., 350.
—. See also Rees, C. W., jt. author, 416.
Unger, J., 870.
Union of South Africa. Rep. Dir. Abatt., Live Stk Mkts, Vet. Serv., Johannesburg, 1937-38, 398; 1938-39, 638.
United States of America. Annu. Rep. agric. exp. Sta., 481.
—. Conf. Wkrs Pullorum Dis., 825.
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—. Rep. N.Y. St. vet. Coll., Cornell, 1937-38, 899.
—. Rep. Surg. Gen. U.S. Army, 1936, 226; 1938, 728; 1939, 813.
Upp, C. W. See Goff, O. E., jt. author, 875.
Upp, C. W. See also McClary, C. F., jt. author, 191.
Urbain, A., 906.
—, Bullier, P., & Nouvel, J., 22.
—, Dechambre, E., & Nouvel, J., 906.
—, & Nouvel, J., 131, 909.
—, Thiéry, J. P., Nevot, A., & Courtade, R., 937.
Urbányi, L. See Marek, J., et al., jt. authors, 198, *bis*, 199, 298, 366, 784.
d'Ursel, F. See van den Berghe, L., jt. author, 341, *bis*.
Usov, Y. A., 577.
Uspenskiĭ, Raevskiĭ, & Voskresenskiĭ, 733.

V

Vaček, T., 139.
Vaclrca, F., 601.
Vaughan, J. M., & Saifi, M. F., 607.
Vawter, L. R., & Records, E., 188.
—. See also Fleming, C. E., et al., authors, 131.
Vaz, Z., & Teixeira de Carvalho, G., 178.
Vechiu, A., 337.
van der Veen, H. T., 24.
Veenbaas, A. H., 480.
—, & Sjollema, P., 293.
—. See also 't Hooft, P. J., jt. author, 268.
Veenstra, P. M., 41.
Veeraraghavan, N., & Philipsz, G. L. C., 760.
Vellisto, E., 271, *bis*.
Veloppé, 508.
Velu, H., 308, *bis*.
—, & Boutrois, M., 383.
—, & Zottner, G., 240.
—. See also Policard, A., jt. author, 444.
Venema, H., 161.
Verder, E. See Evans, A. C., jt. author, 231.
Verge, J., 22, 823.
—, Buck, G., Drieux, H., & Florence, G., 110.
—, & Drieux, H., 650.
Verstraete, A., 616.
—, & Cloetens, R., 51, *bis*, 366.
Verzár, F., 901.
Vet. Bull. U.S. Army, 672.
Vet. Med., 41.
Vet. Rec., 358, 556, 633, 635, 888.
Vianello, G., 334, 690.
Victor, J., & Potter, J. S., 951.
—. See also MacDowell, E. C., et al., jt. authors, 950.
Vidal, C. See Carvalho, A., jt. author, 74.
Videsott, R., 353.
Viera, O., 327.
—. See also Pou, M. C., et al., jt. authors, 415, 686.
de Villiers, O. T., 801.
Vintrup, B. See Fridericia, L. S., et al., jt. authors, 865.
Violle, H., 920.
Viridén, P., 938.
Viswanathan, G. R., 82.
Vitamin E, symposium on, 405.
Vittoz, R., 931.
Vivanco, F. See Edgar, C. E., et al., jt. authors, 867.
van Vloten, J. M., 534.
Vogler, G., 968.
Voiculesco, T. See de Grolier, A., jt. author, 123.
Volkova, A. A., 578, 689, 706.
Voloskov, P. A., 972.
Voskresenskiĭ. See Upsenskiĭ, et al., jt. authors, 733.
Vytiaco, P. See Rivadelo, T. F., et al., jt. authors, 87.
Vzorova. See Zaprudnyĭ, jt. author, 904.

W

Waddington, C. N., 311.
Wadowski, S. See Obitz, E., jt. author, 58.
Wadsworth, A., Maltaner, F., & Maltaner, E., 434.
de Waele, A., 592.
—, & de Cooman, E., 847.
Wagener, K., 781.
Wagers, R. P. See McLeod, W. M., jt. author, 143.
Wahlich, A. See Kahlfeld, F., jt. author, 68.
von Wajgiel, E. R., 963.
Waksman, S. A., 827.
Walch-Sorgdrager, B., 333.
Waldmann, O. See Gildemeister, E., et al., jt. authors, 153.
Wales, W. T. See Hawking, F., et al., jt. authors, 56.
Walker, D. See Blumer, C. C., et al., jt. authors, 119.
Walker, F. H. A. See Bottomley, A. C., et al., jt. authors, 464, *bis*.
Walker, J. W. See Pulvertaft, R. J. V., et al., jt. authors, 620.
Walker, O. J., 227.
Walker, R. V. L. See Mitchell, C. A., et al., jt. authors, 124, 174, *bis*.
Walker, U. W. F., 219.
Wall, E. M. See Fitch, L. W. N., et al., jt. authors, 381.
—. See also Grimmett, R. E. R., et al., jt. authors, 381.
Wall, S., 851.
Walsh, F. E. See Eveleth, M. W., et al., jt. authors, 612.
—. See also McNutt, S. H., jt. author, 855.
Walter, H. E., 486.
Walton, A., & Edwards, J., 469.
Warburton, C., 844.
Ward, A. H., 440.
Ward, E. N. See MacDowell, E. C., et al., jt. authors, 950.
Ward, R. E., Bechdel, S. I., & Guerrant, N. B., 544.
—. See also Flora, C. C., et al., jt. authors, 614.
Warner, E. D. See Brinkhous, K. M., et al., jt. authors, 135.
Warnock, G. McM. See Duckworth, J., et al., jt. authors, 455.
Warren, R., 385.
Warren, S. L. See Ide, H. G., et al., jt. authors, 363.
Warrington Yorke. See Lourie, E. M., jt. author, 57.
Watanabe, S. See Nakamura, N., et al., jt. authors, 253.
Watanuki, T., & Fujii, T., 35.
Waterhouse, D. F., 842.
Waters, D. F., 954.
Waters, P. C. See Becker, E. R., jt. author, 918.
van der Wath, J. G. See Quin, J. I., jt. author, 967.
—. See also Quin, J. I., et al., jt. authors, 967.
Watkins, C. V., 634.
Watson, E. A., 188, 306.
—. See also Dalling, T., et al., jt. authors, 112.
—. See also Dunkin, G. W., et al., jt. authors, 237.
—. See also Henry, M., et al., jt. authors, 278.
Watson, H. M. S. See Bottomley, A. C., et al., jt. authors, 464.
—. See also Folley, S. J., 391.

Watson, R. B. See Proske, H. O., jt. author, 501.
Wautié, M., 380.
Weakley, C. E., Jr., & Dustman, R. B., 61.
Weber, H. H., 626.
Webster, J. H. D., 92.
Webster, L. T., 26, 254, 673.
—, & Hodes, H. L., 529.
Webster, W. M., 191, 274, 716.
Weed, A., 962.
Wehr, E. E., 849, *bis*.
Weikl, 905.
Weil, A. J., & Parsons, C. H., 433.
Weil, P. E., 647.
Weill-Hallé, B., 652.
Weinberg, M., & Guillaumie, M., 659.
Weir, J., 640.
Weirether, F. J. See Plastridge, W. N., et al., jt. authors, 231.
Weisgerber, F., 972.
Weisman, H. A. See Wooley, D. W., et al., jt. authors, 121.
Weiss, H., 109.
Weiss, M., 298.
Weiss, R., 564.
Weitzenberg, R., 121.
Welch, J. See Moore, C. V., et al., jt. authors, 696.
Wellmann, O., 367.
—. See also Marek, J., et al., jt. authors, 198, *bis*, 199, 298, 366, 784.
Wells, A. Q., & Brooke, W. S., 737.
Wells, H. E., 698.
—. See also Dunlop, G., et al., jt. authors, 612.
Wells, M. W. See Wells, W. F., et al., jt. authors, 397.
Wells, W. F., Wells, M. W., & Mudd, S., 397.
Wember, H., 48.
Werner, A. E. A., 375.
Wertheim, P., & Rukavina, J., 261.
Werthessen, N. T. See Pincus, G., jt. author, 216.
Westenhöfer, M., 449.
Wester, J., 136.
Westfall, B. B. See Smith, M. I., et al., jt. authors, 58.
Westman, A., & Jacobsohn, D., 390.
Westphal, A., 827.
Wetzel, R., 33.
—, & Enigk, K., 583, 597.
Wetzler-Ligeti, C. See Csato, T., et al., jt. authors, 194, 212.
Whipple, G. E. See Ray, J. D., jt. author, 760.
Whipple, G. H. See Hahn, P. F., et al., jt. authors, 696, 798, *bis*.
—. See also Madden, S. C., jt. author, 797.
White, C. T. See Legg, J., jt. author, 131.
White, E. G., 59, 60.
—, & Ellis, A. A. B., 460.
White, F. R. See White, J., jt. author, 860.
White, H. J. See Litchfield, J. T., Jr., et al., jt. authors, 618.
White, J., & White, F. R., 860.
White, P., & Caughley, F. G., 948.
Whitehead, H. G., & Hicok, H., 321.
Whitelaw, W. See Gaisford, W. F., et al., jt. authors, 618.
Whitlock, H. V. See Gordon, H. McL., jt. author, 217.
Whitlock, J. H., 684.
—, & Leasure, E. E., 684.
—, Link, R. P., & Leasure, E. E., 684.
—. See also Ackert, J. E., et al., jt. authors, 683.
Whitlock, J. H. See also Leasure, E. E., et al., jt. authors, 384.
Whitnah, C. H., Peterson, W. J., Atkeson, F. W., & Cave, H. W., 785.
Whitney, L. F., 295.
Whitty, J. D. See Dunkin, G. W., et al., jt. authors, 237.
—. See also Ross, I. C., et al., jt. authors, 178.
Whitworth, S. H., 894.
Widdowson, E. M. See McCance, R. A., jt. author, 696, *bis*.
Wiebringhaus, H., 257.
Wiemann, 710.
Wiener, A. S., & Silverman, I. J., 602.
Wiesner, B. P. See Csato, T., et al., jt. authors, 194, 212.
Wigglesworth, V. B., 403.
Wight, A. E., 739.
Wilcke, H. L. See Lee, C. D., jt. author, 340.
Wilcocks, C., 907.
Wiley, F. H. See Hueper, W. C., et al., jt. authors, 451.
Wilkening, H., 352.
Wilkins, H. W. See Marsh, H., jt. author, 83.
Willett, J. C. See Sulkin, S. E., jt. author, 255.
Williams, H. B., 399.
Williams, J. W., 18.
Williams, K. T. See Miller, W. T., jt. author, 964.
Williams, L. F. See Plastridge, W. N., et al., jt. authors, 231.
Williams, R. J., 228.
—. See also Snell, E. E., et al., jt. authors, 786.
Williams, S. W. See Burnet, F. M., jt. author, 674.
Willis, H. S., 687.
Wilson, E. P. See Marsh, H., jt. author, 534.
Wilson, G. S., 283.
—, & Schwabacher, H., 9.
—. See also Elkington, G. W., et al., jt. authors, 788.
—. See also Schwabacher, H., jt. author, 322.
Wilson, J. E., 655.
—. See also Morgan, D. O., jt. author, 596.
Wilson, R. J. See Philip, R. C. T., et al., jt. authors, 784.
Wilson, W. A. See Loewenthal, L. J. A., jt. author, 146.
Winer, J. H., & Schroeder, C. R., 694.
van Winkle, W., Jr., & Cutting, W. C., 792.
Winkler, A. W. See Hoff, H. E., et al., jt. authors, 624.
Winn, M. See Ingersoll, R. L., et al., jt. authors, 702.
Winter, A. R. See Hunt, C. H., et al., jt. authors, 201.
Winter, I. C., 557.
Winterhalter, M., 772, *ter*.
Wintersteiner, M. P. See MacDowell, E. C., et al., jt. authors, 950.
Wintersteiner, O., & Smith, P. E., 388.
Wintrobe, M. M., 862.
—, Samter, M., & Lisco, H., 862.
—. See also Rich, A. R., et al., jt. authors, 136, *bis*.
Wirth, D., 21, 133.
Wise, E. C. See Correll, J. T., jt. author, 457.
Wise, G. H., & Anderson, G. W., 384.
Wisnicky, W., 740.
De Wit, J. J. D., 715.
Witenberg, G. See Adler, S., et al., jt. authors, 917.
Withers, F. W., 192.
Witjens, J. C., 698.
Witts, L. J. See Hobson, F. C. G., jt. author, 954.
—. See also Black, D. A. K., et al., jt. authors, 796.
Witzigmann, J., 946.
Wolf, C. H. See Seelemann, M., jt. author, 36.
Wolfe, H. D. See Hueper, W. C., et al., jt. authors, 451, *bis*.
Wolff, L. K., & Julius, H. W., 704.
Wolfthügel, K., 523.
Woods, D. D., 790.
Woods, G. M. See Boynton, W. H., jt. author, 833.
Wooldridge, W. R., 464.
Wooley, D. W., Waisman, H. A., & Elvehjem, C. A., 121.
Woolley, D. W., & Hutchings, B. L., 314.
Woolsey, C. I. See Herrold, R. D., jt. author, 8.
Worden, A. N., 49.
—. See also Chick, H., et al., jt. authors, 956, *bis*.
Work, C. E. See el Sadr, M. M., et al., jt. authors, 867.
Wormall, A. See Boursnell, J. C., jt. author, 554.
—. See also Boursnell, J. C., et al., jt. authors, 211.
Wotton, R. M. See Culbertson, J. T., jt. author, 830.
Wright, M. D. See Drummond, J. C., et al., jt. authors, 546.
Wunsch, D. S., 861.
Wyckoff, R. W. G. See Beard, J. W., et al., jt. authors, 589.
Wyllie, J., 549.
Wyssmann, E., 441, 445.

Y

Yakimoff, W. L., & Matschoulsky, S. N., 19, *bis*.
—. See also Jakimov, V. L.
Yakimov, V. L., Senyushkina, V. P., & Machul'skiĭ, S. N., 918.
Yamashita, J., 679.
Yanamura, H. See Meyer, K. F., et al., jt. authors, 272.
Yarrow, T. B. See Downham, K. D., jt. author, 604.
Yesinick, L. See Libet, B., jt. author, 474.
Yoffey, J. M., & Sullivan, E. R., 256.
Yokogawa, S., & Ro, M., 556.
Yosikawa, M., & Somazawa, K., 876.
Youmans, G. P., Liebling, J., & Lyman, R. Y., 469.
Youmans, J. B., 864.
Young, A. See Fleming, C. E., et al., jt. authors, 131.
Young, F. G. See Rowlands, I. W., jt. author, 389.
Young, M. R., 680.
Young, W. J. See Dickson, B. T., et al., jt. authors, 755.

Z

Zagrodzki, K., 16.
—, Kulczycki, J., Bak, A., & Sidor, K., 39.
Zaharija, I., 745.
—. See also Hupbauer, A., jt. author, 604.
al Zahawi, S. See Beattie, C. P., et al., jt. authors, 412.
Zakharevich, T. A., 522.

Zaprudnyĭ, & Vzorova, 904.
Zaribnicky, F., 46.
Zarubkinskiĭ, V. S., 746.
—, & Khodzhibekov, S., 689.
Zaytzeff-Jern, H., & Meleney, F. L., 124.
Zein-el-Dine, M., & Rowland, S. J., 229.
—. See also Rowland, S. J., jt. author, 229, *bis*.
Zeldes, M. See Blatt, M. L., et al., jt. authors, 841.
Zeljko, M., 760.
Zeller, H., 268.
—, & Henninger, R., 913.
Zeyland, J. See Piasecka-Zeyland, E., jt. author, 492.
Žibert, Š., 576.
Zichis, J., 335.
Ziegler, H., & Hauser, H., 559.
Zilahy, A., 348.
Ziltener, W., 217.
Zinn, E., 52.
Zochowski, P., Rogiński, Z., & Teklińska, M., 494.
Zofijevsky, V., 254.
Zontschew, W. T., 181.
Zottner, G., 727.
—. See also Miègeville, J., jt. author, 928.
Zottner, G. See also Velu, H., jt. author, 240.
Zschokke, M., 475.
Zsemlye, G., 391.
Zuger, B. See Friedemann, U., jt. author, 38, 436.
—. See also Friedemann, U., et al., jt. authors, 436.
Zuliński, T., 43.
Zumbro, P. B., 973.
Zwanenburg, T. S., 206.
Zwick, W, 512.
Van Zwieten, M. See van der Schaaf, A., jt. author, 650.

SUBJECT INDEX

The index is fundamentally constructed from the titles of articles, which may not indicate all the points of interest in the abstract or original. Readers should therefore always search the main headings and the "general" sub-headings for points of special interest:—*e.g.* for references to the diagnosis of bovine brucellosis, see "*Brucella* infection, general" and "*Brucella* infection, in cattle" in addition to "*Brucella* infection, diagnosis". General headings should also be searched for particular parasites. For drug treatment see under name of condition treated.

A

ABATTOIRS. Report of Director of Abattoir and Live Stock Market Department, Johannesburg, 1937-38, **398**; 1938-39, **638**; Germany, animal diseases and abattoir returns for 1936, **570**.
See also *Mycobacterium tuberculosis* Infection, meat inspection; Reports.

ABDOMEN. Anatomy of the abdomen of calves, **624**.

ABORTIN. See *Brucella* Infection, diagnosis [allergic test].

ABORTION. Causes in cattle free from Bang's disease, **39**; aetiology of abortion in mares, **190**; virus abortion in mares, **107**; in Yugoslavia, **604**; role of mineral deficiency in equine abortion, **611**; mouldy hay a cause in cows and mares, **532**; contagious abortion in sheep, **454**.
See also *Brucella* Infection; *Clostridium* Infection, in cattle; Hormones, sex hormones; Iron, deficiency; *Trichomonas* Infection, in cattle; *Vibrio foetus*.

ABYSSINIA. See Army Veterinary Work.

ACAPRIN. See *Babesia* Infection, treatment; *Theileria* Infection.

ACCLIMATIZATION. See Immunity, general.

ACETONAEMIA. Clinical and non-clinical cases, **278**.

ACETONURIA. Aetiology and therapy in cattle, **109**.

ACID-FAST BACTERIA. See *Mycobacterium*, general.

ACIDOSIS. Detection in ruminants by urine analysis, **195**.

ACRIDINE. Chemotherapy of bacterial diseases by, **292**.

ACRIFLAVINE. See *Trypanosoma*, general.

ACTINOBACILLOSIS. Of animals in India, **413**; in sheep, **83**.

ACTINOMYCOSIS. Of animals in India, **413**; of man and animals in Holland, **327**; of the dog and cat, **83**; treatment by sodium iodide, **874**; "tyrosinase reaction" of the Actinomycetes, **581**; classification of, **827**.
See also *Proactinomyces*.

ADENOMA. Contagious lung-adenomatosis in sheep in Iceland, **274**; "jaagsiekte" in Germany and *Strongylus*-adenomatosis of sheep's lungs, **274**; resemblance of pulmonary adenomatosis (jaagsiekte) in sheep and cancer of the lung in man, **362**; intestinal adenoma in a pig, **44**; adenomatous stomach lesions in strain I mice, **193**, **539**.

ADRENAL GLAND. Lesions in grass tetany, **277**; adrenal endocrinology, **143**; function of the adrenal cortex, **901**; standardization of cortical extracts by the use of drakes, **62**.
See also Adrenalin; Vitamins, vitamin B complex, vitamin C.

ADRENALIN. Pharmacological and therapeutic actions of related compounds, **211**.
See also Blood, chemical composition; Milk, chemical composition; *Plasmodium* Infection, treatment.

AEDES. See Mosquitoes.

AEGYPTIANELLA PULLORUM INFECTION. In poultry, **753**.

AEROSOLS. See Disinfectants.

AFRICA. See Diseases General, Unspecified, control; *Glossina*; Poisoning, plants; Research Institutes; Rinderpest; Ticks, general, diseases transmitted by, and under names of component countries.

AGALACTIA, CONTAGIOUS. Of sheep in Italy, **25**; size of filtrable agent, **255**.

AGENESIA, CEREBELLAR. Three cases, **109**.

AGGLUTINATION. Mechanism of, **433**; influence of temperature on the agglutination reaction, **271**; variation in titre over long periods, **271**.
See also Antigen-Antibody Reactions, and under name of specific organism and disease.

AGRICULTURE. See Books, general.

AIR RAID PRECAUTIONS. For animals, **634**, **721**.
See also Gases, Poisonous.

ALBANIA. Livestock diseases in, **569**.
See also Reports.

ALGERIA. See Army Veterinary Work; Foot and Mouth Disease, immunization; Influenza, swine; Rabies, immunization; Reports; *Rickettsia* Infection; *Theileria* Infection.

ALKALI DISEASE. See Selenium.

ALKALOIDS. See Poisoning, general.

ALLERGIC TESTS. See under name of specific disease.

ALLERGY. See Blood, corpuscles [white]; Skin, general, and under name of specific disease.

AMBLYOMMA. See Ticks.

***p*-AMINOBENZENESULPHONAMIDE.** See Sulphamide Compounds, therapy.

***p*-AMINOPHENYLSULPHAMIDE.** See *Mycobacterium tuberculosis* Infection, treatment; Sulphamide Compounds.

***p*-AMINOSULPHONAMIDE.** See Sulphamide Compounds, therapy.

β-AMINOPYRIDINE. See Vitamins, vitamin B complex.

AMOEBA INFECTION. See *Entamoeba* Infection.

ANAEMIA. Cobalt salts in induced canine anaemia, **196**; hypochromic anaemias and iron deficiency, **696**.
See also Vitamins, vitamin B complex, vitamin B_6.
Treatment. Iron and haemoglobin formation in anaemia due to blood loss, **798**; response of nutritional macrocytic anaemia to anahaemin, **120**.

ANAEMIA, EQUINE INFECTIOUS.
General, **898**; in Sweden, **25**; in Germany, **173**; importance of diet as a predisposing factor, **25**; immunity, **671**.
Diagnosis. Chemical test for haemosiderin in the liver and spleen, **759**; haematological differential diagnosis, **252**.
Pathogenesis. Variability of the clinical picture, **252**; histopathological studies in the horse, **421**; changes in the pulmonary artery in horses, **252**.
Transmission. Experimental infection of horses, **173**, **252**; part played by biting insects, **671**; transmission to splenectomized piglets, **252**; attempts to infect rabbits, **759**.
Treatment. With sulphanilamide, **125**.
Virus. Distribution in the organs during the non-febrile stages of the disease, **253**; virus content of the saliva of infected horses, **253**.

ANAEMIA, HOOKWORM. See *Ancylostoma*.

ANAEROBES. See *Clostridium*; Media.

ANAEROBIC INFECTIONS. Observations on "quail disease" or ulcerative enteritis in quail, **827**.
See also *Clostridium* Infection.

ANAESTHETICS. Nitrous oxide and nitrogen narcotization of animals to be slaughtered according to the Jewish ritual, **550**.

ANAPHYLAXIS. Reversed anaphylaxis, **186**; nature of anaphylactic ferments, **38**; anaphylaxis as related to biologic prophylaxis and treatment of animals, **105**; histaminase treatment of anaphylactic shock in g. pigs, **446**.

ANAPLASMA INFECTION. See also Tick Fever.
General. In the buffalo, **416**; among deer in the natural state, **833**.

ANAPLASMA INFECTION [cont'd].
In Cattle. Effects of injection into Bovidae of emulsions of *Anaplasma*-infected ticks, **662**; counts of infected and non-infected erythrocytes in bovine anaplasmosis, **416**; morphology of the causative agents of piroplasmosis in cattle in the U.S.S.R., **502**.
Immunization. Vaccination of bovines in Queensland, Australia, **86**.
Treatment. Inefficacy of intravenous injections of crystal violet against bovine anaplasmosis, **898**.
ANATOMY. See Abdomen; Brain; Digestive System, general; Histology; Liver; Oesophagus; Pituitary Gland; Respiratory System; Teeth; Thorax.
ANATOXINS. See under specific organism and disease.
ANCYLOSTOMA. Hookworm disease in dogs, **33**; canine ancylostomiasis and the formol-gel test [French Equatorial Africa], **772**; blood platelets in hookworm anaemia, **850**.
ANEURIN. See Vitamins, vitamin B_1.
ANGOLA. Livestock diseases in, **980**.
See also Reports; *Trypanosoma* Infection, in cattle.
ANILINE DYES. See Disinfectants; Neoplasms, causation.
ANIMAL HUSBANDRY. Agriculture and animal husbandry in India, 1936-37, **722**; animal husbandry in the colonial empire, **64**.
See also Reports, Europe.
ANISOL VACCINE. See Foot and Mouth Disease, immunization.
ANTAGONISM OF INFECTIONS. Effect of anti-anthrax vaccination on foot and mouth disease, **103**; F. & M. disease as predisposing factor in *Brucella abortus* infection, **690**; susceptibility to anthrax of g. pigs with surra, **575**.
See also Bacteria General, antagonism.
ANTELOPES. See Carcinoma; Chamois; Elands; Kudu; *Trypanosoma* Infection, in ruminants.
ANTHELMINTICS. Control of helminth parasites of domestic animals, **58**; effect of certain drugs on helminthiasis of ruminants, **378**; hydrogen peroxide as a general anthelmintic for dogs, **295**; treatment of helminth infection of poultry with iodine, **709**; anthelmintic efficiency of tetrachlorethylene and "Sprehn capsules" against ascarid (*Toxocara*) and *Uncinaria* infestation of silver foxes, **795**; *n*-butyl chloride as an anthelmintic, **795**; anthelmintic action of flavones, **962**; anthelmintic efficiency of "lentin" in sheep **875**.
See also Phenothiazine; and under name of helminth.
ANTHRAX. See *Bacillus anthracis* Infection.
ANTIBODIES. Chemistry of, **435**; permeability of the human placenta to antibodies, **602**; antibodies in the serum of poliomyelitis patients, **771**; neutralization of pathogenic agents in tissues by circulating antibodies, **38**.
See also Antigen-Antibody Reactions; Blood, groups; Immunity, general; Viruses, general.
ANTICOAGULANTS. See Blood, chemical composition.
ANTIGENS.
General. Chemistry of, **435**; specificity of formolized proteins, **770**.
See also Antigen-Antibody Reactions; Immunization; and under name of specific organism.
In Non-Absorbable Excipients. See *Brucella* Infection, immunization; *Mycobacterium tuberculosis*, in oil; *Mycobacterium tuberculosis* Infection, immunization.
ANTIGEN-ANTIBODY REACTIONS. Calculation of antibody-antigen ratio, **433**; quantitative absolute methods in the study of antigen-antibody reactions, **102**; specific character of the stage of aggregation in agglutination and precipitation of antigen-antibody compounds, **852**; antigen-antibody reactions between layers adsorbed on built-up stearate films, **433**.
ANTIGUA. See British West Indies.
ANTIHAEMORRHAGIC VITAMIN. See Vitamins, vitamin K.
ANTIHORMONES. See Hormones; Pituitary Gland, thyrotrophic hormone.
ANTIMOSAN. See *Theileria* Infection, treatment; *Trypanosoma* Infection, treatment.
ANTISEPTICS. See Disinfectants.
ANTITOXINS. Physiological study of the formation of antitoxins, **436**.
See also Bacteria general, toxins; Immunization, and under name of organism and disease.
ANTIVIRUS. Treatment with Besredka's antivirus of skin lesions due to mustard gas, **128**; a therapeutic agent for suppurative conditions, **39**.
ANTRYPOL. See Germanin (Bayer 205).
APPARATUS. Colour tests of blood serum with the Pulfrich photometer in various equine diseases, **885**; special syringes for skin tests, **216**; testing milking machine accessories, **970**; automatic regulation of the bunsen burner flame by the inoculation needle holder, **564**; cleaning of laboratory glassware, **475**.
See also Blood, transfusion, sedimentation rate; Desiccation; Filtration; Hydrogen-Ion Concentration; Media; Microscopy; Slaughter; Sterilization; Technique.
ARGASIDAE. See Ticks.
ARGENTINE. See *Mycobacterium tuberculosis* Infection, in cattle.
ARMY VETERINARY WORK. Role of the veterinary service in modern warfare, **634**; the army veterinary service of Burma **804**; veterinary report of the French army in France, Algeria, Tunisia, Morocco and the Levant, **224**; Italian veterinary service in the Italo-Abyssinian war, **890**.
See also Reports.
ARSENIC. Activity of aromatic arsenical compounds, **792**; arsenic content of the cerebrospinal fluid after administration of arsenic compounds, **56**.
See also *Histomonas meleagridis* Infection [Blackhead]; Poisoning, metals metalloids and salts; *Rickettsia* Infection; *Spirochaeta* Infection; Strongyles; *Theileria* Infection, treatment; Ticks, control; *Trypanosoma* Infection, treatment.
ARSENOBENZENE. Elimination of arsenobenzene by normal animals and those with the reticulo-endothelial system blocked, **793**.
See also *Trypanosoma* Infection, treatment.
ARSINIC ACIDS. Relations between the chemical constitution and the trypanocidal and neurotoxic actions of aromatic arsinic acids, **793**.
ARTHRITIS. Chronic arthritis in wild mammals, **155**; aetiology of polyarthritis in the rat, **165**; salt intake in relation to arthritis of camels in British Somaliland, **707**; degenerative arthritis in horses and mules in Panama, **942**; treatment of influenzal arthritis with M. & B. 693, **461**; sulphanilamide treatment of joint-ill (polyarthritis) of lambs in East Anglia, **777**.
ARTHROPOD PARASITES. Losses occasioned by insects, mites and ticks in the United States, **178**; entomology in India, past, present, and future, **678**; ectoparasites of domesticated animals in Burma, **932**; annual report of the Medical Entomologist, Nyasaland Protectorate, for 1938, **843**; chemical control of insect pests of animals, **342**.
See also *Bacterium tularense* Infection [Tularaemia]; *Ephestia*; Flies; Invertebrate Vectors of Disease; Lice; *Linguatula*; *Lyperosia*; Mange; Midges; Mites; Myiasis; Oestridae; Parasitic Infestation, general; Reduviidae; Repellents; *Simulium*; Ticks.
ARTIFICIAL INSEMINATION. See Insemination, Artificial.
ASCARIDIA. Food of the fowl nematode, *A. lineata*, **683**; viability of the ova of *A. lineata*, **347**.
See also Immunity, to metazoa.
ASCARIDS. Intermittency of egg excretion by ascarids in foxes, **596**.
ASCARIS. Skin reactions to *Ascaris* antigens in healthy slaughter swine and those infected with *A. lumbricoides*, **352**; extracorporeal hatching of the eggs of *A. suum*, **683**; biology of immature *A. lumbricoides*; pulmonary infestation of rodents and reinfestation of human beings, **682**; attempt to isolate the toxic substance contained in extract of *A. megalocephala*, **595**; toxicity of extracts of *Ascaris*, **264**; anti-proteolytic enzyme of *A. lumbricoides* var. *suis*, **263**; fatty acids excreted by ascarids in oxybiosis, **260**; oxidizing enzymes in gas production by *A. lumbricoides*, **260**; aerobic and anaerobic metabolism in the *Ascaris* of swine, **260**; pyrethrum as an ascaricide, **795**.
ASCORBIC ACID. See Vitamins, vitamin C.
ASIA MINOR. See *Theileria* Infection.
ASPERGILLUS INFECTION. Pulmonary aspergillosis in fowls in Uruguay, **165**; an endotoxin from *A. fumigatus*, **498**; a serological study of *A. fumigatus*, **498**; trace elements in cultivation of *Aspergillus*, **196**.
ATAXIA. See Swayback.
ATEBRIN. See *Trypanosoma* Infection, treatment.
ATMOSPHERE. See Infection Routes.
ATOXYL. Toxicity for poultry, **296**, **710**.
AUJESZKY'S DISEASE.
General, **928**; in Northern Ireland, **24**; absence of virus from the brains of infected animals, **840**; lysis of the central nervous system in, **928**.
In Swine. Inapparent Aujeszky's disease in swine in the middle west of America, **675**.
In Turkeys. Transmission of Aujeszky's disease to turkeys, **841**.
Virus. Effect of desiccation on the virus, **928**; action of high temperatures on the virus, **673**; propagation on the chorio-allantois, **674**.
AUSTRALIA. Livestock diseases in Queensland, **150**, **567**; in New South Wales, **637**; diseases in slaughter animals in South Australia, **788**.
See also *Anaplasma* Infection; *Babesia* Infection [Piroplasmosis], bovine; Bones, diseases; *Brucella* Infection, control; *Clostridium* Infection, in sheep; Coast Disease; Cobalt, general; *Diphyllobothrium*; "Falling Disease" of Cattle; Food Inspection, meat inspection; Fowls, diseases general; Helminth Parasites, general, of cattle; Hybrids; *Myco-*

AUSTRALIA [cont'd].
bacterium tuberculosis Infection, control; Myiasis, in sheep; Pleuropneumonia, bovine contagious; Poisoning, cyanide, plants; Psittacosis; Quarantine; Reports; Research, general; *Rickettsia* Infection; *Streptococcus* Infection, in cattle; Swine, diseases general; Tick Fever; *Trichostrongylus*.
AUSTRIA. See Germany.
AVITAMINOSIS. See Vitamins.
AZURUFIN REDUCTASE TEST. See Milk, bacterial content.

B

BABESIA INFECTION [PIROPLASMOSIS].
General. Canine piroplasmosis in India, **247**; caprine piroplasmosis in Azerbaijan, **919**; in sheep in Hungary, **247**.
See also Tick Fever.
In Cattle. In Lower Saxony, **331**; *Babesia berbera* infection in zebus, limousines, and zebu-limousine crosses in Madagascar, **752**; morphology of the causative agents of cattle piroplasmosis in the U.S.S.R., **502**; clinical differentiation diagnosis of piroplasmosis and theileriasis in cattle, **331**; vaccination in Queensland, Australia, **86**; schizogony cycle of an endoglobular parasite in the red blood cells of cattle; creation of a new family in the suborder Piroplasmidea, **502**.
In Equines. Piroplasmosis in horses and mules in Madagascar, **752**; streptococcal pneumonia of foals as a complication of nuttalliasis, **442**.
See also *Babesia* Infection, transmission.
Pathogenesis. Destructive action of parasites on the internal organs of mammals, and the associated schizogony of the Babesiidae, **833**.
Transmission. Survival of *B. ovis* in vector ticks, **919**; part played by *Rhipicephalus bursa* in the spread of equine nuttalliasis, **919**.
Treatment. Specific treatment of piroplasmosis with acaprin, **126**; treatment of ovine babesiasis with acaprin, **58**; chemotherapy and immunology of canine babesiasis, **707**.
B. BERBERA. See *Babesia* Infection, in cattle.
B. OVIS. See *Babesia* Infection, general, transmission, treatment.
BACILLAEMIA. See Blood, bacterial content; *Mycobacterium tuberculosis* Infection, in dogs.
BACILLARY WHITE DIARRHOEA. See *Salmonella pullorum* Infection.
BACILLUS ABORTUS-EQUI. See *Salmonella abortus-equi*.
B. ANTHRACIS.
Chemical Composition. The polysaccharides of the anthrax bacillus, **819**.
Cultivation. Exaltation and attenuation in culture, **232**; antagonism between *B. anthracis* and *Bacterium coli*, **578**; amino-acids in the nutrition of *B. anthracis*, **574**.
Differentiation. Morphological and biochemical differentiation of *B. anthracis* and *B. pseudo-anthracis*, **734**.
Variation. R and S variants of *B. anthracis* and their relation to its virulence, **903**; variations of *B. anthracis* from cells isolated by micromanipulation, **316**.
Viability. Of anthrax spores in cleaned and salted sheep gut, **574**; alkali and acid resistance of anthrax spores, **490**.
B. ANTHRACIS INFECTION.
General. Epizootics in South Morocco, **732**; cure of golubatz midge poisoning by anti-anthrax serum, **590**; infection of cattle with anthrax at the site of subcutaneous administration of foot and mouth disease serum, **690**; effect of anti-anthrax vaccination on foot and mouth disease, **103**; activation of latent blackleg infection by vaccination with glucoside anthrax vaccine, **318**; inhibitory action of inflammatory foci on the development of anthrax, **72**; susceptibility to anthrax of g. pigs with surra, **575**.
Control. Anthrax control in South Africa, **941**; anthrax control in man and animals in Bulgaria, **316**; in the Philippines, **158**; destruction of spores in the single-bath chrome-tanning process, **732**; construction and organization of stations for the disinfecting of anthrax-infected hides, **733**; biological-chemical disinfection of material infected with anthrax spores, **317**; sterilizing power of halogens for anthrax bacilli, **317**.
See also *B. anthracis*, viability.
Diagnosis. Testing wool samples for anthrax, **490**; preparation of anti-anthrax precipitating sera, **904**; titration of anti-anthrax serum with sporulating *B. anthracis*, **904**.
Immunization, **489**; glucoside vaccine prepared with Russian saponin, **904**; immunization by means of a non-capsulated but oedematogenic variant of *B. anthracis*, **232**; standardization of anti-anthrax sera, **5**; simultaneous vaccination against anthrax and blackleg, **318**.
In Man. See *B. anthracis* Infection, control, in mink.
In Mink. In farm-raised mink in Oregon, **71**; with infection of a ranch owner, U.S.A., **488**.
Pathogenesis. Spread of anthrax bacilli in the body after intradermal injection, **649**; early septicaemia in anthrax, **819**.
Transmission. The carrier problem, **649**; anthrax bacilli in the digestive tube of *Tabanus rubidus*, **574**; anthrax in pigs from animal feeding stuffs, **232**.
Treatment. With sulphanilamide, **124**, **790**.
B. ENTERITIDIS. See *Salmonella enteritidis*.
B. MALLEI. See *Pfeifferella mallei*.
B. PSEUDO-ANTHRACIS. See *B. anthracis*, differentiation.
BACTERAEMIA. See Blood, bacterial content.
BACTERIA GENERAL.
General. Text-books, **154**, **483**, **899**, **900**; behaviour of bacteria towards ultra-violet rays in a fluorescent medium, **94**; wavelength interference between bacteria and blood cells as a cause of disease, **607**; a Gram-negative, motile *Bacterium* agglutinable by *Br. abortus* antiserum, **241**.
See also Eggs, transmission of infection through; Therapeutics, of bacterial diseases.
Antagonism. Between *Bact. coli* and *Salmonella enteritidis*, **824**; between *Bact. coli* and *Bacillus anthracis*, **578**; inhibitory action of inflammatory foci on the development of anthrax, **72**
See also Antagonism of Infections.
Bactericidal Agents. Ultra-violet light, **94**, **489**, **970**; destruction of aerobic and anaerobic bacteria by ultra-violet rays, **217**; a bactericidal agent extracted from a soil bacillus, **806**; toxicity for dogs, **806**; bactericidal action of prostatic fluid in dogs, **469**.
Classification. Invalidity of the genus *Bacteroides* Castellani and Chalmers: reclassification, **164**.
See also *Clostridium*, general.
Cultivation. Cultivation of "necrosis bacteria", **393**.
See also Technique, bacteriological.
Differentiation. Of bacteria from virus and phage by a serial dilution method, **519**; Gram-differentiation of bacteria, **393**, **562**; coliform bacteria, **78**.
Flora of Organs and Tissues. Influence of diet on the distribution of bacteria in the stomach, small intestine and caecum of the rat, **784**; relationship of diet to the self-regulatory defence mechanism; pH and bacterial flora, **242**; digestion of cellulose by bacteria in mammals, **628**; micro-organisms in the gall-bladder of various animals, **17**; bacteraemia, **242**.
Growth. Accessory growth factors for bacteria and related micro-organisms, **17**, **328**; gelatin as a source of growth-promoting substances for bacteria, **328**.
See also Bacteria General, toxins.
Haemophilic. Haemoglobinophilic bacteria, pathogenic for man, in the respiratory passages of a healthy cat, **579**.
Technique. See Staining; Technique, bacteriological.
Toxins. Growth factors and toxinogenesis, **16**; glutathionaemia in horses injected with bacterial toxins, **601**; use of non-specific substances in the production of diphtheria antitoxin, **437**.
See also Embryos, fowl.
Viability. The survival of micro-organisms in fixed and stained preparations, **329**.
See also Bacteria General, bactericidal agents; Ultra-Violet Rays.
BACTERIOLOGY. See Bacteria General.
BACTERIOPHAGE. Growth of bacteriophage and lysis of the host, **842**; adsorption of bacteriophage under various physiological conditions of the host, **842**; behaviour of bacteriophage towards ultra-violet rays in a fluorescent medium, **94**; variability of *Pasteurella pestis* under the influence of bacteriophage, **411**; effect on bacteriophage of sulphamide compounds, **124**; isolation of bacteria from phage by a serial dilution method, **519**.
BACTERIUM ABORTIVO-EQUINUS. See *Salmonella abortus-equi*.
BACT. AERTRYCKE. See *Salmonella typhi-murium*.
BACT. COLI. Endotoxic components of *Bact. coli* and their immunizing capacity, **527**.
See also Bacteria General, antagonism; Coliform Organisms.
BACT. COLI INFECTION. Of lambs in the U.S.S.R., **578**; slow lactose-fermenting bacteria pathogenic for young chicks, **79**.
BACT. ENTERITIDIS. See *Salmonella enteritidis*.
BACT. EQUIRULIS. Studies on *Shigella equirulis* (*Bact. pyosepticum*), **654**.
BACT. NECROPHORUM. See *Fusiformis necrophorus*.
BACT. SANGUINARIUM. See *Salmonella gallinarum*.
BACT. SUIPESTIFER. See *Salmonella cholerae-suis*.
BACT. TULARENSE INFECTION [TULARAEMIA]. In Sweden, **238**; in hares in Yugoslavia, **576**; in Turkey, **162**; transmission by the fin prick of a catfish, **494**; pathology and histopathology in g. pigs, **78**; survival of *Bact. tularense* in the dead bodies of rodents at different temperatures, **577**; persistence of *Bact. tularense* in the tissues of argasid ticks, *Ornithodoros turicata* and *O. parkeri*, **823**; *O. lahorensis* a possible transmitter of tularaemia in Turkey, **591**; arthropod vectors, **411**.
BACTEROIDES. See Bacteria General, classification.

BAHAMAS. Livestock diseases in, **722**.
BALANTIDIUM INFECTION. *Bal. coli* in swine in Switzerland, **418**; biometric researches on balantidia from swine, **834**.
BANG'S DISEASE. See *Brucella* Infection.
BANKRUPT WORMS. See *Trichostrongylus*.
BARTONELLA INFECTION. In a calf, **248**; *Bart. sturmani* n.sp. in the buffalo, **416**; progress in the study of *Bartonella* infections, **753**; *Bart. muris* and its cultivation *in vitro*, **248**.
BASUTOLAND. Animal diseases in, **724**.
See also Reports.
BATS. See Rabies, transmission.
" BAYER 205 ". See Germanin.
B C G. See *Mycobacterium tuberculosis*, BCG; *Mycobact. tuberculosis* Infection, immunization [BCG].
BELGANYL. See Germanin.
BELGIAN CONGO. Livestock diseases in, **805**.
See also Breeding; *Trypanosoma* Infection, general, in swine.
BELGIUM. See Foot and Mouth Disease, control; *Mycobacterium tuberculosis* Infection, control.
BENZYLSULPHANILAMIDE. See Sulphamide Compounds, toxicity.
BERIBERI. See Vitamins, vitamin B_1.
BILE. Action of normal bile on rinderpest virus, **335**; bile acid calculi and bile acid occurring in nature, **279**.
BILE PIGMENTS. See Bilirubinaemia; Blood, pigments.
BILE SALTS. See Viruses, inactivation.
BILHARZIA. See *Schistosoma*.
BILIRUBIN. See Blood, chemical composition.
BILIRUBINAEMIA. Icterus neonatorum in man and neonatal bilirubinaemia in domestic animals, **41**.
BIOCHEMISTRY. Text-books, **228**, **310**, **404**, **815**; animal pigments, **467**.
See also Metabolism General, general.
BIOLOGICAL PRODUCTS.
General. Advisory committee on biological products [Nat. Vet. Med. Ass., Great Britain], **888**.
Preservation. Desiccation of filtrable tumours and other biological materials, **562**.
See also *Mycobacterium tuberculosis*, tuberculin; Rabies, virus; Rinderpest, virus.
Standardization. Biological, **218**; biological standards in Great Britain, **808**; report of serologists of the permanent commission of biological standardization (Paris, 1938), **63**; British standard specification for veterinary cod liver oil, **556**.
See also *Bacillus anthracis* Infection, immunization; *Clostridium* General, antitoxins; *Clostridium tetani* Infection; Hormones, general; Vitamins, vitamin B_1, vitamin E.
BISON. See Hybrids.
BLACK DISEASE. See *Clostridium* Infection, in horses.
BLACKHEAD. See *Histomonas meleagridis* Infection.
BLACKLEG, BLACKQUARTER. See *Clostridium chauvoei* Infection.
BLACKTONGUE. See Vitamins, vitamin B complex.
BLINDNESS. See Congenital Defects; Eyes, diseases; Vitamins, vitamin A.
BLOOD.
General. Clinical and laboratory haematology, **647**; a symposium on the blood and blood-forming organs, **406**; osmotic pressure of the blood of various animals, **882**; the blood of the ostrich, **801**; wavelength interference between bacteria and blood cells as a cause of infectious disease, **607**.
See also Blood-Brain Barrier; Infection Routes; Reticulo-Endothelial System.
Bacterial Content. Bacteraemia, **242**.
See also *Mycobacterium tuberculosis* Infection, in dogs.
Chemical Composition. Chemical changes in the blood and their clinical significance, **540**; influence of anticoagulants on the estimation of blood constituents, **885**; determination of blood fat of dairy cattle, **144**; determination of bilirubin in the blood serum of horses and cattle, **217**; composition of bovine blood as influenced by gestation, lactation and age, **133**; influence of atmospheric temperature on the blood sugar of cattle, **298**; urea content of the blood of healthy cattle, **298**; glutathione content of blood in various domestic animals, **61**; variation in the blood sugar in sick horses, **442**; effect of subcutaneous implantations of adrenalin tablets on blood sugar of lactating ruminants, **464**; chemical composition of the blood of the dairy goat, **135**; studies on the composition of bovine blood. I. Magnesium content of the plasma of the normal dairy calf, **134**; II. Seasonal variations in plasma magnesium of growing dairy calves, **797**; influence of the mineral composition of the diet on the mineral content of the blood in pigs, **298**; sodium content of the blood of mammals, **560**; sodium content of horse blood, **625**; influence of age on blood potassium, **468**; effect of severe haemorrhage on the concentration of copper in the blood of sheep, **800**; base-protein-acid compounds prepared from fibrin, **135**;
See also Acetonaemia; Bilirubinaemia; Blood, pigments, plasma, serum; Bones, diseases; Broncho-Pneumonia; Copper; Grass Sickness; Iron; Ketonaemia; *Leptospira* Infection, in dogs; Magnesaemia; Metabolism General, general; Rickets; Rinderpest, immunization; Swine Fever, general; Vitamins, vitamin A, vitamin B complex, vitamin B_1.
Coagulation. Heparin and thrombosis, **621**; a coagulative serum prepared by injecting hirudin, **601**; delayed prothrombin clotting time in avitaminosis A and pellagra-like chicks, **49**; inhibition of blood clotting by an unidentified substance, **135**; simple method for measuring clot retraction, **563**.
See also Vitamins, vitamin K.
Corpuscles [General]. Normal blood cells in the bovine, **625**; cellular blood elements of normal kittens, **560**.
Corpuscles [Red]. Resistance of red blood cells of pied lowland cattle to hypotonic salt solutions, **387**.
See also *Anaplasma* Infection, in cattle.
Corpuscles [White]. Studies on white blood cells, **880**; extravascular dévelopment of the monocyte observed *in vivo*, **561**; the lymphocyte in acute inflammation, **279**; the lymphocyte in the body's reaction to foreign protein, **136**; differentiation of myeloblasts from lymphoblasts by their locomotion, **136**; uniformity in the differential enumeration of leucocytes, **474**.
See also Blood, sedimentation rate; Phagocytosis; *Trypanosoma* Infection, immunity.
Counts. See Blood, corpuscles [white], picture.
Diseases. See Blood, bacterial content, chemical composition; Cobalt, general; Glutathionaemia; Haemoglobinaemia; Pregnancy, diseases; Purpura; Toxaemia.
Formation. Avian bone-marrow and red cell development, **966**; types of haemopoietic reaction in domestic animals, **133**; an enzymic theory of haemopoiesis, **966**; metallic elements and blood formation, **560**.
Groups. Permeability of the human placenta to antibodies, **602**.
Haemoglobin. Haemoglobin content of the blood of pigs, **134**; constitution of swine in relation to the haemoglobin ratio, **367**; haemoglobin metabolism in chronic infections, **607**.
Identification. Of blood ingested by Reduviidae by the precipitin test, **601**.
Picture. Of the horse, **713**; in healthy foals, with special reference to leucocytes, **625**; of pigs with deficiency of water-soluble vitamins and other substances contained in yeast, **862**; of warm-blooded animals in relation to body constitution, **386**; of normal chickens, **214**; error of the blood cell count made with the haemocytometer, **970**.
See also *Brucella* Infection, general; *Capillaria*; Grass Sickness; Helminth Parasites, of cattle; *Histomonas meleagridis* Infection [Blackhead]; *Mycobacterium tuberculosis* Infection, tuberculin test; Swine Fever, general.
Pigments. Properties and quantitative determination by spectrophotometric methods, **467**; the diazo test for bile pigments in the blood, **798**; relation of porphyrins to the metabolism of blood pigments, **627**.
See also Blood, chemical composition.
Plasma. Source, production and utilization of plasma proteins, **797**; plasma volume and " available fluid " changes in dehydration, **135**.
Platelets. See *Ancylostoma*; Purpura.
Pressure. Relation to serum concentration of potassium, calcium and magnesium, **624**.
Respiratory quotient. Oxygen in the blood of the umbilical vessels of sheep, **626**.
See also Pneumonia, general.
Sedimentation Rate. Of white blood corpuscles, **719**; instrument for recording erythrocyte sedimentation rate and volume of cells and plasma on a single permanent record, **392**.
See also *Trypanosoma* Infection, general.
Serum. Colour tests of blood serum with the Pulfrich photometer in equine diseases, **885**; physico-chemical state of calcium in the serum of ruminants, **468**; partition of serum calcium in domestic animals—some pathological cases, **468**; partition of serum calcium in Ayrshire cows, **629**; at parturition in the dairy cow, **629**.
See also Blood, chemical composition; Leucosis; *Mycobacterium tuberculosis*, cultivation; Sarcoma, fowl.
Transfusion. In cattle, **632**; the vein seeker—a simple instrument for entering collapsed veins, **888**.
" BLOOD SWEATING " IN HORSES. See *Parafilaria*.
BLOOD-BRAIN BARRIER, 144.
BLOWFLIES AND FLESH FLIES. See Myiasis.
BLOWLAMPS. See *Eimeria* Infection [Coccidiosis], in fowls.
BLUE-TONGUE. In cattle and sheep in South Africa, **940**.
BONES.
General. Influence of the nervous system on bone and joints, **466**.
See also Growth; Pituitary Gland, growth hormone.

BONES [cont'd].
Composition. Variation in weight and composition of the long bones of animals, **61**.
See also Magnesium, deficiency.
Diseases. Rickets and osteomalacia, **198**; osteomalacia: the known factors, **698**; osteomalacia in cattle in India, **285**; osteomalacia in cattle, **954**; porphyria of the bones of a cow, **777**; abnormal limb postures in Swiss brown cattle: histology of the bones, **542**; control of osteodystrophia in Australian horses in the Dutch East Indies, **698**; incoordination of Equidae: wobblers, **611**; Izuka's test for osteoporosis in horses, **455**; ostitis (osteodystrophia) fibrosa in dogs, **954**; serum calcium and phosphorus of turkeys with a bone deformity, **784**.
See also Neoplasms, general; Osteochondromatosis; Porphyrinuria; Rickets; Vitamins, vitamin A, vitamin C, vitamin D.
BOOKS.
General. The social function of science, **572**; agriculture in the twentieth century: essays presented to Sir Daniel Hall, **406**.
Anatomy. Development and structure of molar teeth in donkeys and horses, **647**.
Bacteriology. The biology of bacteria: an introduction to general microbiology, **899**; a text-book of medical bacteriology, **483**; handbook of bacteriology for students and practitioners of medicine, **154**; bacteria: the smallest living organisms, **900**; bacteriological culture medium technique, **68**; general tissue and humoral response to an avirulent tubercle bacillus, **154**; tuberculosis of the guinea pig, **226**; primitive tuberculosis, **227**; brucellosis in man and animals, **648**; visceral localization and surgical aspect of *Brucella* infection [in man], **648**.
Biochemistry. A text-book of biochemistry, **228**; an introduction to biochemistry, **815**; fundamentals of biochemistry in relation to human physiology, **404**; laboratory methods of biochemistry, **310**.
Diseases General. Of breeding ewes, **900**; poultry practice: a collection of discussions on poultry diseases and related subjects, **646**; diseases of poultry in New South Wales, **728**.
Entomology. A laboratory guide for introductory courses, **648**; principles of insect physiology, **403**.
Food Inspection. Practical food inspection: volume I: meat inspection, volume II, fish, poultry, and other foods, **571**; text-book of meat inspection, **227**.
Genetics. Genetics: an introduction to the study of heredity, **486**; an introduction to modern genetics, **311**; mammalian genetics, **902**; evolution of genetic systems, **404**; manual for a laboratory course in genetics, **902**.
Haematology. Clinical and laboratory haematology, **647**; symposium on the blood and blood-forming organs, **406**.
Immunity. Immunity to infectious diseases, **484**.
Metabolism. Vital energetics: a study in comparative basal metabolism, **156**; nitrogen metabolism: the physiology of protein substances, **982**.
Nutrition. Nutritional physiology of the adult ruminant, **729**; vitamin D: chemistry, physiology, pharmacology, pathology, experimental and clinical investigations, **730**; vitamin E, a symposium, **405**.
Parasitology. Principles of parasite control, **729**; parasites and parasitic diseases of horses, **485**.
Pathology. Pathological histology, **571**; symptomatology and comparative pathology, **483**; chronic arthritis in wild mammals, **155**.
Physiology. Secretion of milk, **226**; function of the adrenal cortex, **901**.
Reference Books. Index-catalogue of medical and veterinary zoology: part 3. Authors: C to Czygan, **807**.
Statistics. Statistical methods for medical and biological students, **982**; use of statistics in pathology, **312**.
Technique. Elementary microtechnique, **901**; the microscope: theory and practice, **648**; fluorescence analysis in ultra-violet light, **647**; spectrographic analysis in Great Britain, **311**; absorption spectrophotometry and its application: bibliography and abstracts 1932 to 1938, **227**.
Therapeutics. Practical veterinary pharmacology, materia medica, and therapeutics, **646**.
Toxicology. Poisonous plants of the United States, **156**.
Veterinary Science. The practice of veterinary medicine, **645**.
Viruses. Text-book on viruses: part II, **419**; handbook of virus disease, **153**; the virus: life's enemy, **900**; the true nature of viruses, **309**.
Warfare Animals in chemical warfare, **485**.
BOOPHILUS. See Ticks.
BORDER PINE. See Pine Disease.
BORNA DISEASE, 512.
BORON. In animal nutrition, **196**.
BORRELIA. Growth of *B. duttoni* in the developing egg, **243**.
BOTS. See Oestridae.
BOTULISM. See *Clostridium botulinum* Intoxication.
BOVINE CONTAGIOUS ABORTION. See *Brucella* Infection, in cattle.
BOVINE MALIGNANT CATARRH. See Catarrh, bovine malignant.
BRACHYLAEMUS. *B. suis*, pathogenic role and development, **262**.
BRADSOT. The so-called "X-bradsot" disease of Karakul sheep, **658**.
BRAIN.
General. Size of cross sections of the gyri olfactorii communes in dogs and cats, **560**; oxygen supply of the foetal brain of sheep, **626**.
See also Staining.
Diseases. Hydrocephalus in a group of experimental rabbits, **606**; changes in occipital, temporal and parietal areas in horses with internal hydrocephalus, **109**.
See also Agenesia; Carcinoma; Encephalitis; Encephalomyelitis; Lipoma; *Listerella* Infection; Nervous System, diseases; Schweinsberg Disease; Viruses, neurotropic.
BRAXY. See *Clostridium Infection*, in sheep.
BRAZIL. See Diseases General, Unspecified, control; *Fimeria* Infection, in goats, in sheep; *Mycobacterium tuberculosis* Infection, in cattle; Nematodes, general; Rabies, immunization.
BREEDING. Contraselection, **106**; diseases of breeding animals, **107**; notes on the selection of breeding bulls, **43**; environment and animal breeding; cattle breeding in the semi-arid regions of South Africa, **475**; improvement of livestock in Nigeria, **804**; livestock breeding in the Belgian Congo in 1937, **805**; genetic approach to the control of adult mortality in the fowl, **112**; reduction of mortality in fowls by breeding, **773-774**; breeding strains of poultry resistant to fowl paralysis, **112**; a co-ordinated breeding and pullorum-control programme for the United States: the national poultry improvement plan, **973**.
See also Fertility; Fur Animals; Genetics; Insemination, artificial; Sterility; Vitamins, vitamin B_2.
BRITISH EMPIRE. See Services, veterinary.
BRITISH GUIANA. Livestock diseases in, **722**.
See also Minerals, deficiency.
BRITISH HONDURAS. Livestock diseases in, **308**.
See also Reports.
BRITISH SOMALILAND. Livestock diseases in, **477**.
See also Arthritis; Reports; Skin, diseases.
BRITISH WEST INDIES. Livestock diseases in Antigua, **643**.
See also Helminth Parasites, of fowls; Reports.
BROKEN WIND. See Emphysema.
p-BROMOBENZENE. See Selenium.
BRONCHITIS, AVIAN INFECTIOUS. In poultry, **278**; a growing yeast medium for the cultivation of an organism causing bronchitis in chickens, **473**.
BRONCHITIS, PARASITIC. See Lungworms.
BRONCHOPNEUMONIA. Urea and chloride content of the blood in bovine infectious bronchopneumonia, **605**; nature and transmission of enzootic bronchopneumonia (pneumo-enteritis) of dairy calves, **43**; enzootic bronchopneumonia in pigs, **43**; histopathology of contagious bronchopneumonia of swine, **947**.
BROWN-PEARCE TUMOUR. See Neoplasms, general.
BRUCELLA GROUP.
General. Differentiation of R and S strains of *Br. abortus* by non-specific agglutination, **16**; a Gram-negative, motile *Bacterium* agglutinable by *Br. abortus* antiserum, **241**.
Antigens. Complete antigen of *Brucella*, **241**; photoelectric and volumetric methods for determination of the density of *Br. abortus* antigens, **718**; preparation of *Br. abortus* plate antigen; factors affecting its sensitivity, **852**; properties of antigenic preparations from *Br. melitensis*, I and II, **15**; —. III. Properties of the antigen and products of gentle hydrolysis, **356**; —. IV and V, **746**; antigenic surface of smooth *Br. abortus* and *melitensis*, **15**.
Antiserum. Preparation and purification of *Brucella* antiserum, **527**.
Chemical Composition. Protein-nucleates of *Brucella*. I and II, **657**.
Cultivation. Peculiar cultural requirements of a strain of *Br. abortus*, **655**; selective cultivation of *Streptococcus agalactiae* and *Br. abortus*, **968**; the incubating egg as a differential medium for *Br. abortus* and *Str. agalactiae*, **630**; nicotinic acid and thiamin hydrochloride as growth-promoting factors for brucella, **82**.
Viability. In heated milk, **549**.
Virulence. Of *Br. abortus* for laboratory animals and pregnant cattle, **580**.
BRUCELLA INFECTION.
General. Proceedings of the North Central States Bang's disease

BRUCELLA INFECTION—General [cont'd].
conference, U.S.A., **743**; report on conference on Bang's disease of the North Atlantic States, U.S.A., 1937, **739**; report of the special committee on Bang's disease [American Veterinary Medical Association], **13**; brucellosis in Iraq, **412**; in man and animals, **648**; foot and mouth disease as predisposing factor in *Br. abortus* infection, **690**; temperature and blood picture of infected g. pigs and rabbits, **240**.
In Calves. See *Brucella* Infection, diagnosis, immunization.
In Cattle. In Hungary, **105**; in Bulgaria, **186**; in Yugoslavia, **326**, **772**; observations on a newly infected herd, **825**; localization of *Br. abortus* in the bovine uterus, **80**; communicability of infectious abortion between swine and cattle, **912**.
See also *Brucella* Group General, virulence; *Brucella* Infection, control, diagnosis, transmission, treatment.
Control, 164; accomplishments and difficulties in control of Bang's disease, **745**; segregation system of control, **412**; control in a large herd, **744**; Bang's disease control in the U.S.A., **739**; in Illinois, U.S.A., **325**; in Australia, **81**; in Germany, **412**; in Hungary, **105**; in Lithuania in 1937, **603**; in Norway, **826**.
Diagnosis [General]. In sheep, **746**; studies of saliva and salivary glands for the presence of *Br. abortus*, **14**; modification of Huddleson's opsonocytophagic reaction, **938**.
Diagnosis [Allergic Test], 688, 745; specificity of abortin, **689**; effect of heat on the activity of abortin, **689**; intradermal test, **688**; intradermal test of sheep brucellosis with the "Dubois brucellore", **657**; modified allergic reactions in *Br. melitensis* infection of sheep, **272**; diagnosis in sheep and goats by allergic tests, **271**.
Diagnosis [Serological]. Agglutination test, **271, 851**; in the U.S.A., **899**; in Iava, **746**; rapid agglutination tests, **35, 36, 938**; Diernhofer's rapid agglutination test, **526**; agglutination test with milk, **689**; variations in agglutinin levels in a herd with chronic brucellosis, **744**; serological blood tests on calves and young cattle in infected herds, **580**; sources of error in the agglutination test, **271, 938**; in the slow agglutination (test tube) method, **36**; comparative results of tube and plate tests on suspicious animals, **271**; comparative value of the agglutination and complement-fixation tests and Meinicke's reaction, **184**; diagnosis of equine brucellosis with Meinicke's reaction, **37**; serological diagnosis of bovines brucellosis. I. Flocculation with blood and milk. II. Rapid and slow agglutination tests with blood and milk, **36**; serological tests for brucellosis in dogs, **326**; a further method for testing blood sera for *Br. abortus*, **851**.
In Goats. *Br. abortus* infection in, **14**; Malta, second progress report of the *Br. melitensis* research station, **496**.
See also *Brucella* Infection, diagnosis [allergic test], immunization.
In Horses, 326; in Hungary, **163**; *Br. abortus* agglutinins in horses in Scotland, **14**.
See also *Brucella* Infection, diagnosis [serological], transmission.
Immunity. Resistance to Bang's disease of cattle recovered from an artificially induced outbreak, **81**; immunity in cattle vaccinated with a non-virulent strain of *Br. abortus*, **81**; infection and reinfection experiments, **744**.
Immunization. Vaccination against Bang's disease, **739**; immunizing power of vaccines in fatty excipients, **581**; calfhood vaccination, **897, 913**; in Northern Ireland, 1938-39, **581**; field immunization with strain 45 vaccine, **913**; suitable dose of *Br. abortus* for immunization of cattle, **80**; vaccination of sheep, **497**; of g. pigs and ewes against *Br. melitensis* infection, **656**; intradermal vaccination of ewes with live *Br. abortus* to protect against *Br. melitensis*, **657**; vaccination of goats, **496**; immunization of rabbits against undulant fever, **657**; *Br. abortus* vaccine, **565**; innocuity and efficacy of live vaccines coated in lanoline, **240**; controversial points regarding anti-brucella vaccines in non-absorbable excipients, **655**.
In Man [Undulant Fever], 648; in Edmonton, Canada, **81**; in Dalmatia, **327**; in Rome, **15**.
See also *Brucella* Infection, in milk, treatment.
In Milk. Undulant fever due to drinking raw milk, **788**; milk in Ankara, Turkey, from the point of view of brucellosis, **616**; undulant fever and the Maltese milk problem, **655**; tests of Zagreb market milk for *Br. abortus*, **701**; necessity for special treatment of milk from *Brucella*-infected herds, **204**; detection of *Br. abortus* in raw milk, **290, 787**; staining methods for *Brucella* in milk, **290**; value of the ring test (ABR) for *Br. abortus* in raw milk, **599**; behaviour of *Br. abortus* in milk and some milk products, **912**.
See also *Brucella* Infection, in man [undulant fever]; Milk, bacterial content.
In Poultry, 163.
In Sheep. In Turkmenia, U.S.S.R., **581**; studies on contagious abortion in sheep. IV. Excretion of *Br. melitensis* from infected ewes after abortion, **578**.
See also *Brucella* Infection, diagnosis [general], diagnosis [allergic test], immunization, treatment.
In Swine. Communicability of infectious abortion between swine and cattle, **912**.
Transmission. Hidden foci of *Brucella* infection in herds, **826**; Bang's disease apparently spread by an infected horse, **412**.
Treatment. With sulphanilamide, **462, 826, 897**; effects of sulphanilamide on *Br. melitensis*, *abortus*, and *suis*, **294**; of *Br. melitensis* infection with dagenan (M. & B. 693), **462**; of *Br. abortus* infection with M. & B. 693, **553**; with fouadin and prontosil, **294**; of ovine brucellosis with rivanol, **706**; of *Br. abortus*-infected cattle with "abortulin", **580**; value of the "serobortan-vaccine" method of Oppermann-Curtius, and the AO_3 method of Bertram, **913**.
See also *Brucella* Infection, control.
BR. ABORTUS. See *Brucella* Group, general, antigens, cultivation; *Brucella* Infection, various headings.
BR. MELITENSIS. See *Brucella* Group, antigens; *Brucella* Infection, diagnosis, in goats, immunization, in sheep, treatment.
BUDGERIGARS. See Leucosis, avian; Sarcoma, fowl.
BUFFALOES. See *Anaplasma* Infection; *Bartonella* Infection; Deg-nala Disease; Helminth Parasites; *Pasteurella* Infection.
BUFO MARINUS. See Poisoning, general.
BULGARIA. See *Bacillus anthracis* Infection, control; *Brucella* Infection, in cattle; *Mycobacterium tuberculosis* Infection, in cattle, in swine.
BURMA. Livestock diseases in, **639**.
See also Army Veterinary Work; Arthropod Parasites, general; *Mycobacterium tuberculosis* Infection, bovine type infection; Parasitic Infestation, general; Reports; Trematodes, general.
BUTOLAN. See *Trichinella* Infection, treatment.
***n*-BUTYL CHLORIDE.** See Anthelmintics.

C

CAECECTOMY. See *Chellomastix* Infection; Growth; *Trichomonas* Infection, in birds.
CALCIUM.
General. Importance of calcium content of diet, **367**; calcium metabolism and teeth, **867**; inadvisability of giving calcium supplements to foxes and mink, **455**; comparison of the effects of large doses of calcium gluconate-idonate, calcium gluconate, and calcium chloride, **872**.
See also Blood, chemical composition, pressure, serum; Carbon Tetrachloride poisoning; Grass Tetany; Hormones, sex hormones; Minerals.
Deficiency. Calcium deficiency syndrome in growing animals, **454**; effects of a low calcium diet on goats and kids, **454**; effects of changes in dietary calcium on neuromuscular transmission, **612**.
See also Blood, pressure, serum; Hormones, sex hormones; Minerals, metabolism; Rickets.
CALCIUM GLUCONATE. See Calcium, general; *Streptococcus* Infection, general.
CALVES. Report of the research committee on diseases of young calves [Royal Agricultural Society of England], **691**; causes of deaths among calves in dairy herds, **358**; low birth rate of calves and calf mortality, **605**.
See also Abdomen; *Bartonella* Infection; Blood, chemical composition; Bronchopneumonia; *Brucella* Infection; Cattle; Congenital Defects; Diarrhoea; Helminth Parasites, of cattle; Iron; Kidneys, diseases; Liver, diseases; Lymphatic System, diseases; Magnesium; Milk, nutritive value; *Mycobacterium tuberculosis* Infection; Myiasis, general; Pneumonia; Rinderpest, virus; Rumen; *Streptococcus* Infection, in cattle; Thorax; Vitamins.
CAMELS. See Arthritis; Skin, diseases; *Spirochaeta* Infection, general; *Trypanosoma* Infection, diagnosis.
CAMEROONS. See *Trypanosoma* Infection, in dogs.
CANADA. Livestock diseases in, **305**.
See also *Brucella* Infection, in man; Committees; Dogs, diseases general; Food Inspection, general; Milk, diseases transmitted by; Reports; Swine, diseases general; Wild Animals and Birds.
CANARIES. See Pox, in birds.
CANCER. See Neoplasms.
CANINE HYSTERIA. See Hysteria, canine.
CANNIBALISM. Cannibalism-preventing properties of the fibre fraction of oat hulls, **785**.
CAPILLARIA. *C. bovis* from a Chosen calf, **597**; life-history and epidemiology of the fox lungworm, *C. aerophila*, **183**; *C. contorta* in turkeys, **267**; development of the pigeon capillarid, *C. columbae*, **849**; blood picture of chickens infected with *C. columbae*, **266**; viability of the ova, **266**; lesions produced in guinea fowls and pheasants by *C. perforans*, **935**.

CAPILLARY FRAGILITY. See Purpura; Vitamins, vitamin P.
CAPTIVITY, ANIMALS IN. See Zoological Gardens.
CARBON TETRACHLORIDE.
Poisoning. In the pig, **59**; in the ox, **557**; influence of fasting and administration of castor oil upon its toxicity in the ox, **576**; protective action of vitamin against carbon tetrachloride poisoning, **522**.
Therapy. See *Fasciola*; trematodes.
CARCINOMA. Serological diagnosis of cancer; a review of the precipitin reaction, **949**; carcinoma of the cerebellum in a horse, **364**; in the ear in cattle, **783**; of the osteoblastoma in an antelope, **610**; squamous cell carcinoma of the tongue in dogs, **182**; transmission of susceptibility to blood spread carcinoma, **880**.
See also Neoplasms, General.
CARCINOSARCOMA. Influence of Walker carcinosarcoma on convertase activity in various organs and tissues, **180**.
CARNIVORES. See Cats; Dogs; Ferrets; Foxes; Mink; Skunks; Sheep; Raccoons.
CAROTENE. See Vitamins, vitamin A.
CARTILAGE. See Osteomyelopathy.
CASEOUS LYMPHADENITIS. See *Corynebacterium ovis* infection.
CASONI-FOTTERI REACTION. See Helminth Parasites, diagnosis.
CASTOR OIL. See Purgatives.
CASTRATION. See Spermatozoa.
CATARACT. See Eye, diseases.
CATARRH, BOVINE MALIGNANT, 441; in a steer weighing one, 187; guest of, 858; European and African forms of, and sickle, 942.
CATS. See Actinomycosis; Bacteria General, haemophilus; Brain; *Entamoeba* Infection; Helminth Parasites, of cats; *Isospora* Infection; Liver, Cirrhosis; Nerves, Degeneration; Pneumonia Infection; Nematodes, cats; Paramyxovirus; Plague, Infection; Sulphamide Compounds, general; Viruses, cat viruses.
CATTLE.
General. See also Blood, transfusion; Calves; Cerebrospinal Fluid; Hybrids.
Anatomy. See Oesophagus; Thorax.
Arthropod Parasites. See Ectoparasites; Osteoporosis; warbles; Scorpions; Ticks.
Bacterial Diseases. See Bacillus Infection; Clostridium Infection; Coliform Infection; Brucella Infection; Mastitis, bovine; Mycobacterium tuberculosis Infection; Pleuro-Pneumonia; Pseudomonas Infection; Salmonella Infection; Streptococcus Infection.
Diseases General, 440; results of autopsies of cattle dying 1925-28 at the Zagreb veterinary service, Yugoslavia, 772; diseases of cattle in Cuba, 945; pain evaluation in, as a reaction to disease in dairy cattle, 440; treatment of "tongue shaking" in cattle, 296.
See also Acetonaemia; Acetonuria; Bones, diseases; Bronchopneumonia; Carcinoma; Digestive System, diseases; Eczema; Fasciolasis; Footing Disease; Granuloma; Grass Tetany; Keratitis; Kidneys, diseases; Leucosis, bovine; Milk Fever; Nervous, general; Pyelonephritis; Three Day Sickness; Trypanosomiasis; Tunnel Fever; Turning Sickness; Tympanites; Udder.
Genital System. Venereal infections of cattle, **855**; specific infections of the genital organs, **777**.
See also Abortion; Breeding; Contagious Infection in cattle; Exanthema, vesicular; Fertility; Genital System, diseases; Haemoglobinuria; Haemoglobinuria; Hormones, sex hormones; Insemination Artificial; Pregnancy, diagnosis; Sterility; Testicle, diseases; Trichomonas Infection; Vagina; Vaginitis, granular; Vibrio fetus.
Helminth Parasites. See Helminth Parasites, of cattle.
Nutrition. See Blood, chemical composition, serum; Bones, diseases; Copper, deficiency; Diarrhoea; Hypoglycaemia; Iron; Ketosis; Magnesaemia; Minerals, deficiency, metabolism; Nutrition, diseases in relation to; Pica; Sodium Chloride; Vitamins.
Physiology. See Blood, chemical composition, corpuscles, general; corpuscles, red; Cerebrospinal Fluid; Milk, chemical composition; Rumen; Temperature; Udder; Urine.
Poisoning. See Poisoning, metals metalloids and salts; Selenium.
Protozoan Diseases. See Anaplasma Infection; Babesia Infection; *Eimeria* Infection [Coccidiosis]; Tick Fever; *Theileria* Infection; *Trichomonas* Infection; *Trypanosoma* Infection; *Trypanosoma congolense* Infection [Surra].
Virus Diseases. See Viruses, cattle viruses.
CATTLE PLAGUE. See Rinderpest.
CENSUS. See Livestock Populations.
CENTAUREA PICRIS. See Poisoning, plants.
CENTRAL NERVOUS SYSTEM. See Nervous System.
CENTRIFUGATION. A method for determining the differential sedimentation of proteins in the sera of cows, **301**.
CEREBELLUM. See Carcinoma.
CEREBROSPINAL FLUID. Examination in cattle, **713**.
See also Nervous System.
CESTODES, GENERAL. Survey of cestodes of gallinaceous birds, **181**; parasitology, biology of, and control of, in poultry, **582**; life history of *Anoplocephala perfoliata* in horses, **847**; anatomical peculiarities in six species of tapeworms, **889**.
See also Cysticercus; *Dipylidium caninum*; *Echinococcus*; Fasciolasis; *Hymenolepis*; Moniezia; Taenia; Tapeworm; Tetrarhynchus.
CEYLON. Livestock diseases in, **811**, **893**.
See also Reports.
CHAGAS' DISEASE. See *Trypanosoma cruzi* Infection.
CHAMOIS. See Goat; see Mouth Disease, general.
CHASTEK'S PARALYSIS. See Vitamins, vitamin B.
CHEILOMASTIX INFECTION. Effect of treatment in Blackcock, **552**.
CHEMICAL WARFARE. See Gases, poisonous.
CHEMOTHERAPY. See Therapeutics.
CHICK ANTIDERMATITIS FACTOR. See Vitamins, vitamin B complex.
CHICK EMBRYOS. See Rabies, tissue.
CHICKS. See Blood, and Immunity; Blood, coagulation; Chlorosis, Pullorosis; Coccidiosis; Pullorosis; Eggs, Gizzard; Fowl, Diseases; Gizzard; Intestines; Poultry; Rickets; Sarcoids, fowl; Tuberculosis; Trichomonas Infection, immunity; Vitamins.
CHINA. See Helminth Parasites, of swine; Sheep, Diseases; Nematodes, general; Parasites, Protozoan, general; Pneumonia, Nematodes, general; Rabies, Chinese; general; Rickets; Schistosomiasis, Chinese, general.
CHOLERA, FOWL. See *Pasteurella* Infection, in fowls.
CHORIO ALLANTOIC MEMBRANE. See Embryo, fowl.
CHOSEN. See Korea.
CIRCLING DISEASE. See Cerebral Hemorrhage.
CIRCULATORY SYSTEM. See the Heart.
Diseases. Studies on the fatal rupture of the blood vessels of an aged horse, **778**.
See also Anaemia, Equine Infection; Infection; Vitamins, vitamin A.
CIRRHOSIS OF LIVER. See Vitamins, vitamin B complex.
CITTOTAENIA. Life history of *Cittotaenia* sp., **187**.
CLIMATE. Seasonal forward months and seasonal contagion, **585**.
See also Cold and Mouth Disease; Climatology; Climatology, general.
CLONORCHIS. In Yanagawa district, Fukuoka prefecture, Japan, **582**.
CLOSTRIDIUM, GENERAL.
General. Criticism of the modern conception of the genus *Clostridium*, **164**.
Antitoxins. Establishing a standard for Sordelli antitoxin, **659**; proposal to change the strength of the standard antitoxin of gas gangrene antitoxin (*Vibrion septique*), **659**; necessity for changing the potency of the Bonnet gas gangrene antitoxin, **659**.
See also Clostridium, toxins.
Toxins. Toxins and antitoxins of *C. botulinum*, **814**; a descriptive memoir of *Vibrion septique* toxin and antitoxin, **433**; studies on antigenic *C. tetani* toxin, **659**; identification of the toxin of *C. tetani* toxin, **748**; activation of toxins of *C. tetani*, by sulphur-containing amino acids, **125**.
See also Law, Great Britain.
CLOSTRIDIUM INFECTION, GENERAL.
General. Anaerobic glycolysis of bacillus of swine fever immune vaccine, **91**; malignant oedema in cow, **497**.
See also Cow, immunization against *Clostridium chauvoei*.
In Cattle. Gas gangrene of genital organ in a pregnant cow with subsequent death, **108**.
See also Coliform Infection [Bacillus Coli].
In Horses. Anaerobes in the intestinal diseases of, **658**; a case of black disease of experimental, **826**.
In Sheep. Black disease, **526**; enterotoxaemia in sheep in Australia, **497**; *Clostridium tetani* in Cape Dominion and in Northern Ireland, **827**.
See also Braxy.
Treatment. Of malignant oedema with *Clostridium perfringens* antitoxin, **858**; of anaerobic infections with sulphanilamide and with immune sera, **704**.
CL. BOTULINUM INTOXICATION [BOTULISM]. Distribution of botulinus toxin in rice and other foods, **242**; susceptibility of mice to *Cl. botulinum* intoxication, **82**.

CLOSTRIDIUM CHAUVOEI INFECTION [BLACKLEG]. In India, **82**; nature of immunity against blackleg, **748**; simultaneous vaccination against anthrax and blackleg, **318**; activation of latent blackleg infection by vaccination with glucoside anthrax vaccine, **318**; concentration of blackleg vaccine with sodium sulphate, **327**.
CL. OEDEMATIENS. See *Clostridium* Infection, in horses, treatment.
CL. TETANI INFECTION. Sero-vaccination of lambs against tetanus, **747**; immunological effects of simultaneous injections of tetanus anatoxin and sulphamide in rabbits, **376**; standardization of tetanus antitoxin, **939**; use of non-specific substances in the production of tetanus antitoxin, **437**; production of tetanus toxin with a view to obtaining the corresponding anatoxin, **600**.
See also Law, Great Britain.
CL. WELCHII. See *Clostridium* General, antitoxins, toxins; *Clostridium* Infection, in sheep.
COAST DISEASE. Studies on sheep in South Australia, **115**; "coasty disease" trials, King Island, Tasmania, 1938-39, **784**.
COBALT.
General. Australasian work on cobalt since 1937, **861**; cobalt content of New Zealand pastures, **365**, **366**; results of cobalt top-dressing, **197**, **709**; cobalt polycythaemia in the dog, **709**.
Deficiency. See Coast Disease; Pine Disease.
Therapy. Role of cobalt salts in induced canine anaemia, **196**; effect of cobalt on erythropoiesis in anaemic rabbits, **963**.
COCCIDIOSIS. See *Eimeria* Infection; *Isospora* Infection.
COCHLIOMYIA. See Insecticides; Myiasis.
COD LIVER OIL. And animal nutrition, **464**; action of cod liver oil dressings, **796**.
See also Biological Products, standardization; Liver, therapy.
Toxicity. Toxic dystrophy of the liver in swine caused by ingestion of cod liver oil, **130**, **557**, **965**.
COENZYMES. See Vitamins, vitamin B complex.
COFFEE BEAN. See Poisoning, plants.
COLIFORM ORGANISMS. See Bacteria General, differentiation; Milk, bacterial content, pasteurization.
COLLEGES. See Reports.
COLOMBIA. See Goats, diseases general.
COLON-PARATYPHOID BACTERIA. See *Salmonella* Infection, in fowls.
COLOSTRUM. Sterilization of, **563**.
See also Vitamins, vitamin A.
COMMISSIONS. Report on the meeting of serologists of the permanent commission of biological standardization (Paris, October 19th to 22nd, 1938), **63**; Great Britain: 29th report of the development commissioners being for the year ended 31st March, 1939, **636**.
COMMITTEES. Report of the research committee on diseases of young calves [Royal Agricultural Society of England], **691**; Great Britain: Ministry of Health report of the Committee of enquiry into the anti-tuberculosis service in Wales and Monmouthshire, **491**; advisory committee on biological products [National Veterinary Medical Association], **888**; North East of Scotland Sheep Tick Committee, **29**; special committee on Bang's disease [American Veterinary Medical Association], **13**; on tuberculosis [American Veterinary Medical Association], **72**; on food hygiene [American Veterinary Medical Association], **123**; on education [American Veterinary Medical Association], **64**; on public relations [American Veterinary Medical Association], **636**; on communicable diseases affecting man (milk-borne epidemics in U.S.A. and Canada), **701**; on anthrax [Philippine Veterinary Medical Association], **158**; on foot and mouth disease [Philippine Veterinary Medical Association], **87**; on hog cholera [Philippine Veterinary Medical Association], **89**.
See also Reports.
COMPLEMENT. Origin and nature of, **437**.
COMPLEMENT FIXATION. Effect of injections of serum on haemolytic complement, with particular reference to Bordet's anti-immune-body effect, **529**; use of dog sera in complement fixation, **438**.
See also under name of specific disease and organism.
CONFERENCES. Report of the third international conference on the standardization of hormones, Geneva, 1938, **720**; India: proceedings of the Animal Husbandry Research Workers' Conference, New Delhi, February, 1936, **307**.
See also *Brucella* Infection, general; Reports; *Salmonella pullorum* Infection.
CONGASINE. See Surfen C.
CONGENITAL DEFECTS. Imperforate anus in Ganjam calves, **276**; congenital blindness due to a nutritional deficiency in calves in India, **365**; congenital myotonia in goats, **42**, **276**; some hereditary defects in the pig, **779**; inheritance of cryptorchism in swine, **779**; in dogs, **535**.
See also Diseases, inherited.
CONGRESSES. Proceedings of the twenty-fourth Indian science congress, Hyderabad, 1937, **719**; of the twenty-fifth Indian science congress, Calcutta, 1938, **720**.
CONJUNCTIVITIS. See *Rickettsia* Infection.
CONTAGIOUS ABORTION. See *Brucella* Infection.
CONTAGIOUS ECTHYMA. See Ecthyma, Contagious.
CONTAGIOUS PUSTULAR DERMATITIS. See Dermatitis, Contagious Pustular.
CONTRASELECTION. See Breeding.
COOPERIA. Life-history of the nematode *C. curticei*, and development of resistance in sheep, **266**.
COPPER.
General. Fate of copper in the body, **708**, **800**; influence of varying copper intake on normal blood copper of Northumbrian sheep, **468**.
See also Blood, chemical composition; Poisoning, metals metalloids and salts.
Deficiency. Copper deficiency as a cause of disease in cows and goats, **198**.
See also Coast Disease; Swayback.
COPPER SULPHATE. See *Eimeria* Infection [Coccidiosis], treatment; *Haemonchus*; Strongyles.
COPROPORPHYRIN. See Porphyrins.
CORNSTALK DISEASE. See Poisoning, plants.
CORPUS LUTEUM. See Hormones, sex hormones; Ovary.
CORPUSCLES, BLOOD. See Blood, corpuscles.
CORYNEBACTERIUM. Presence of avian tubercle bacilli in apparently pure cultures of diphtheroids, **410**.
See also Bacteria General, toxins.
CORYNEBACT. EQUI INFECTION. Pyaemia in foals caused by, **910**; serological classification of *Corynebact. equi*, **238**.
CORYNEBACT. OVIS INFECTION [CASEOUS LYMPHADENITIS]. Agglutination reaction in *Corynebact. ovis* infection, **938**; caseous lymphadenitis of goats in the Philippines, **493**; study of 134 strains of *Corynebact. ovis*, **76**.
CORYNEBACT. PYOGENES. Toxin production by, **691**; antitoxin content of animal sera, **185**.
CORYZA. Discussion on coryza of poultry, **278**.
COTTON-SEED OIL CAKE. See Poisoning, plants.
COTYLURUS. Deaths in pigeons caused by, **846**.
COW POX. See Pox, general, in cattle, virus.
CRETE. See Leishmania Infection, canine.
CROTONALDEHYDE. See *Mycobacterium tuberculosis* Infection, treatment.
CRYPTORCHIDISM. See Congenital Defects.
CRYSTAL-VIOLET VACCINE. See Swine Fever, immunization.
CTENOCEPHALUS. See Fleas.
CUBONI'S PREGNANCY TEST. See Pregnancy, diagnosis.
CULTURE MEDIA. See Media.
CURLED TOE PARALYSIS. See Vitamins, vitamin B_2.
CYANIDES. See Poisoning, cyanide.
CYPRUS. Livestock diseases in, **809**.
See also Cattle, diseases general; Reports.
CYSTICERCUS. Problems in meat inspection, **33**; destruction in beef by cold storage, **523**; by an atmosphere of CO_2, **523**; experimental studies on *C. cellulosae*, **431**; transmission of *C. ovis* to dogs, **846**; *C. ovis* in a sheep, **847**; effect of sex hormones on resistance of rats to *C. crassicollis*, **263**; attempts to immunize rats and mice against *C. fasciolaris*, **181**; chemical composition of *C. fasciolaris*, **263**.
CYSTINE. See Skin, general.
CYSTINURIA. Canine cystinuria, **948**.
CYTODITES. See Mites.
CZECHOSLOVAKIA. Livestock diseases in, **897**.

D

DAGENAN (M. & B. 693). See Sulphamide Compounds.
DANUBOSIMULIUM. Biological characteristics and migrations of *D. columbaczense* in 1938, **590**; pathogenic action, **765**; natural insect enemies, **259**; cure of golubatz midge poisoning by anti-anthrax serum, **590**.
DAIRIES. Occurrence of tubercle bacilli in waste water from, **788**.
DEER. Results of P.M. examinations of dead deer in Bavaria, **944**.
See also *Anaplasma* Infection, general; *Clostridium* Infection, general; Encephalitis; *Erysipelothrix rhusiopathiae* Infection; Foot and Mouth Disease; Hepatoma; Moose; *Mycobacterium tuberculosis* Infection, in wild animals and birds; Reindeer; Ticks, control.
DEFICIENCY DISEASES. See Bones, diseases; Calcium, deficiency; Cannibalism; Coast Disease; Copper, deficiency; Enzymes; Minerals, deficiency; Nervous System, diseases; Nutrition, diseases in relation to; Pica; Pine Disease; Rickets; Swayback; Trace Elements; Vitamins.
DEG-NALA DISEASE. Of buffaloes, **531**.

DEMODEX. See Mange.
DENMARK. Livestock diseases in, **66**, **644**.
See also Foot and Mouth Disease, general, control, immunization, vaccine; *Leptospira* Infection, in dogs; Oestridae, warbles; Reports.
DERMACENTOR. See Ticks.
DERMATITIS. See Oestridae, bots; Skin, diseases.
DERMATITIS, CONTAGIOUS PUSTULAR. "Sheep pox" in man, **762**; "orf" in man, **671**.
DERMATITIS, VESICULAR. In chickens, **857**.
DERRENGADERA. See *Trypanosoma equinum* Infection [Mal de Caderas].
DERRIS. See Oestridae, treatment.
DESICCATION. Apparatus for desiccation of animal tissues at normal and low temperatures, **970**.
See also Biological Products, preservation.
p-DIAMINODIPHENYLSULPHONE. See *Mycobacterium tuberculosis* Infection, treatment; Sulphamide Compounds.
DIARRHOEA. In cattle on reclaimed land in Holland, **47**, **369**; "white scour" in calves, **48**.
DIARRHOEA, BACILLARY WHITE. See *Salmonella pullorum* Infection.
DIATHERMY. See *Trypanosoma* General, viability.
DIBENZANTHRACENE. See Neoplasms, causation; Reticulo-Endothelial System.
DICROCOELIUM. *D. lanceolatum* in Yugoslavia, **261**.
DICTYOCAULUS. Observations on the biology of, **768**; larvae in the liver of sheep, **685**; biology of *D. arnfieldi* of equines, **597**.
DIGESTIVE SYSTEM.
General. Amount of indican in the stomach and intestinal contents of domestic animals, **299**; digestion of cellulose by bacteria in mammals, **628**; micro-relief elements in the stomach and intestines in domestic animals, **714**; pH of the contents of the digestive canal of the equine, **384**; physiology of digestion in ruminants, **802**; alimentary tract of merino sheep, **967**; reaction of the intestine of the pig to gastric juice, **300**; coprophagy in the rabbit, **635**, **805**.
See also Intestine; Rumen; Stomach; Technique, general.
Diseases. Digestive disorder in cattle due to vagus nerve injury, **854**; digestive diseases of young pigs, **360**; oedema of the digestive organs in young pigs, **189**.
See also Intestines, diseases; Liver, diseases; Stomach, diseases.
DIPHYLLOBOTHRIUM. *D. latum* in dogs in Australia, **847**.
DIPLOSPORA. See *Isospora* Infection [Coccidiosis].
DIPLOSTREPTOCOCCAL SEPSIS. See *Streptococcus* Infection.
DIPS. Effect of suint on sheep dips, **554**; toxicity of some dipping fluids containing arsenic and sulphur, **130**.
DIROFILARIA, 101; *D. immitis* and its transmission in New England dogs, **350**; survival and location of the microfilariae in the dog, **350**; differentiation of canine haematozoa [*Spirocerca* and *Dirofilaria*], **525**; development in mosquitoes, **349**, **350**; in *Aedes aegypti* and *A. albopicta* in Tonkin (Indochina), **349**; natural infection of fleas, **686**; treatment of heartworm infestation in dogs, **463**.
DISEASES GENERAL, UNSPECIFIED. Animal disease situation in Europe in 1938, **565**; some subtropical diseases of the Mediterranean basin, **356**; geographical distribution of tropical diseases of animals, **356**; complex infections, **771**; importance of a knowledge of bodily constitution in relation to animal diseases, **42**; ease of body heat loss and resistance to infection, **606**; conditions necessary for the development of infectious diseases, **439**.
See also Breeding; Immunity, general; Light; Reports; Services, veterinary; Sulphamide Compounds; Viruses, general; Wild Animals and Birds; and under name of animal, name of organ, and name of country.
Control. Rationalization and the incidence of animal diseases, **634**; causes of infection and their significance for breeding and control of animal diseases, **439**; ecological approach to the study of animal diseases in East Africa, **438**; quarantinable diseases of animals in Australia, **64**; preventive measures for control of animal diseases in wartime (Brazil), **146**.
DISEASES, INHERITED. Inheritance of pathological changes in genital organs of cattle, **190**.
See also Congenital Defects; Cystinuria; Porphyrinuria; Swine Fever, transmission.
DISINFECTANTS. Relation between concentration of disinfectants and time required for disinfection, **475**; antiseptic action of the vapours of some solid and liquid substances, **887**; atmospheric and surface sterilization by aerosols, **620**; bactericidal efficiency of certain aniline dyes, **393**; disinfectant power of Merck's "oligodynamic silver tablets", **968**.
See also Formaldehyde; Infection Routes; Phenyl Mercuric Acetate; Sodium *o*-Phenyl Phenolate; Ultra-Violet Rays.
DISTEMPER.
In Dogs. Simultaneous distemper and lymphocytic choriomeningitis in the dog, **95**, **674**; hepatonephritis secondary to distemper, **606**; specific vaginitis in an immature bitch caused by dog distemper virus, **589**; comparative study of distemper inclusions, **928**.
In Foxes. See below.
Immunization. Against dog distemper by virus and serum, **674**; by antiserum, **176**; vaccination of silver foxes against distemper, **425**, **929**.
Virus. Changes in the virulence of distemper virus on fur animal ranches, **425**; studies of distemper virus on the chorio-allantois, **176**.
DOGS.
General. See Complement Fixation.
Anatomy. See Brain; Intestine.
Arthropod Parasites. See Lice; *Linguatula*; Parasitic Infestation, general; Ticks.
Bacterial Diseases. See Actinomycosis; *Brucella* Infection, diagnosis [serological]; *Mycobacterium tuberculosis* Infection; *Pfeifferella mallei* Infection [Glanders], general; *Staphylococcus*, toxins; *Staphylococcus* Infection, treatment.
Diseases General. Recently discovered canine disorders in India, **943**; epidemics among sledge-dogs in the Canadian Arctic, **603**.
See also Encephalomyelitis, general; Heart, diseases; Kidneys, diseases; Neoplasms, general; Nervous System, diseases; Papilloma, general; Peritonitis; Purpura; Skin, diseases; Stomach, diseases.
Fungous Diseases. See Actinomycosis.
Genital System. See Congenital Defects; Hormones, sex hormones; Seminoma; Sterility, treatment; Uterus, diseases.
Helminth Parasites. See Anthelmintics; Helminth Parasites, of dogs; Parasitic Infestation, general.
Metabolism. See Cystinuria; Ketosis.
Nutrition. See Anaemia; Blacktongue; Blood, chemical composition; Bones, diseases; Calcium, deficiency; Cobalt, general; Hysteria, canine; Nutrition, general; Rickets; Vitamins.
Physiology. See Prostate Gland.
Poisoning. See Bacteria General, bactericidal agents; Gases, poisonous; Poisoning, general.
Protozoan Diseases. See *Babesia* Infection [Piroplasmosis], in dogs; *Entamoeba* Infection; *Isospora* Infection [Coccidiosis]; *Leishmania* Infection; *Leptospira* Infection, in dogs; Parasitic Infestation, general; *Rickettsia* Infection; *Trypanosoma* Infection, general.
Virus Diseases. See Viruses, dog viruses.
DONKEYS. See Teeth; *Trypanosoma* Infection, treatment.
DOURINE. See *Trypanosoma equiperdum* Infection.
DOYLE'S DISEASE. See Newcastle Disease.
DROMEDARY. See Camels.
DRUGS. See Therapeutics.
DUCK SICKNESS. See *Clostridium botulinum* Intoxication [Botulism].
DUCKS. See Adrenal Gland; *Clostridium botulinum* Intoxication [Botulism]; *Erysipelothrix rhusiopathiae* Infection; *Salmonella* Infection, in ducks, in eggs; Vitamins, vitamin B_2.
DURAN-REYNALS FACTOR. See *Mycobacterium tuberculosis* Infection, pathogenesis.
DUTCH EAST INDIES. See Bones, diseases; *Mycobacterium tuberculosis* Infection, in cattle, in swine; Newcastle Disease; Reports.
DUTCH GUIANA. See Helminth Parasites, of dogs; *Trypanosoma* Infection, in cattle.
DYSENTERY. See also *Entamoeba* Infection.
Of Swine. In young pigs, **360**; swine dysentery and *Salmonella*, **163**.

E

EAST AFRICA. See Research Institutes.
EAST COAST FEVER. See *Theileria* Infection.
ECHINOCOCCUS. In Greece, **32**; in the United States, **182**; in swine in Holland, **767**; hydatid disease in New Zealand, **183**; biological tests for hydatid disease, **273**; allergic reactions in diagnosis of echinococcosis, **847**; lack of immunity in the rabbit to echinococci from the horse, **847**; cuticular membrane of hydatid cysts, **523**.
ECTHYMA, CONTAGIOUS. Enzootic in sheep in Morocco, **514**; vaccination, **177**.
ECZEMA. Facial eczema in cattle and sheep in New Zealand, **274**; effect on sheep-skins, **948**.
EDUCATION. Veterinary education in India, **723**; in the U.S.A., **633**; report of the committee on education [American Veterinary Medical Association], **64**; Leningrad Institute for the post-graduate training of veterinarians, U.S.S.R., **972**.
See also Colleges; Reports.

EGGS.
Duck. See *Salmonella* Infection, in eggs.
Hen. Invasion by bacteria, **206**; deterioration due to ingestion by hens of malvaceous material, **123**; larva of *Ephestia kuhniella* in, **124**.
See also Food Preservation; Fowl Paralysis; *Mycobacterium tuberculosis* Infection, in eggs.
Seagull. See *Salmonella* Infection, in eggs.
EGYPT. See Milk, bacterial content.
EIMERIA INFECTION [COCCIDIOSIS].
General. In g. pigs in the U.S.S.R., **918**; liver coccidiosis in rabbits, **662**.
In Cattle. A new species of coccidium from, **246**.
In Fowls. Subclinical infection, **661**; in adult fowls, **169**; *E. tenella* in fowls, **19**; changes in the blood, **750**; influence of ration on mortality, **918**; control, **751**; efficiency of the blowlamp for destruction of coccidial oocysts in poultry houses, **246**.
In Goats. In Brazil, **19**, **86**.
In Pheasants. In the U.S.A., **332**; *E. langeroni* n.sp. in, **19**.
In Sheep. In Scotland, **585**; in Brazil, **19**; in Uruguay, **415**; sporulation and viability of oocysts of *E. arloingi*, **661**.
Treatment. With ferric sulphate and copper sulphate in lambs, **211**; of avian coccidiosis with sulphapyridine, **794**; with sulphanilamide, **126**; with sulphur, **377**, **875**; effect of X-rays, **57**.
E. ARLOINGI. See *Eimeria* Infection, in sheep.
E. LANGERONI. See *Eimeria* Infection, in pheasants.
E. TENELLA. See *Eimeria* Infection, in fowls, in goats, in sheep.
EIRE. Livestock diseases in, **978**.
See also Law; Reports.
ELANDS. See *Theileria* Infection.
ELECTRIC STUNNING. See Slaughter.
ELECTROPHORESIS. See Viruses, general.
ELEMENTARY BODIES. See Influenza, immunization; Neoplasms, general; Pox, virus; Viruses, elementary bodies.
ELEPHANTS. Diseases of, **530**.
See also Parasitic Infestation, general; Pleurisy; Skin, diseases; Thorax.
ELK. See Foot and Mouth Disease, in deer.
EMBRYOS. See also Foetus.
Fowl. Action of bacterial toxins on, **940**; use in poultry disease studies, **930**.
See also *Borrelia*; *Brucella*, cultivation; Distemper, virus; Foot and Mouth Disease, virus; Fowl Plague; Horse-Sickness, African; Influenza, Swine; *Leptospira* Infection, general; Neoplasms, cultivation; Pox, in birds; Psittacosis; Rabies, virus; *Spirillum* Infection; Stomatitis, Vesicular; *Streptococcus*, cultivation; Technique, general; *Treponema*; *Trichomonas* General, cultivation; *Trypanosoma* General, cultivation; Viruses, cultivation; Vitamins, vitamin B_2.
EMETINE HYDROCHLORIDE. See *Paragonimus*.
EMPHYSEMA. Broken wind in horses, **853**; pulmonary, in horses and cattle, **533**; mouldy hay a cause, **532**.
EMUS. See *Mycobacterium tuberculosis* Infection, in wild animals and birds.
ENCEPHALITIS. In moose, **276**.
See also Encephalomyelitis; *Listerella* Infection; Turning Sickness.
ENCEPHALOMALACIA. Nutritional, in chicks, and certain related disorders, **203**; treatment with vitamin K, **122**.
ENCEPHALOMYELITIS, GENERAL. In horses in East Poland, **187**; in the dog, **445**.
See also *Listerella* Infection.
ENCEPHALOMYELITIS, AVIAN. Experimental studies on the virus, **763**.
ENCEPHALOMYELITIS, EQUINE.
General, 174, **251**; in North and South America, **838**; in the U.S.A., **339**, **758**, **898**; eastern type in Panama, **943**; in Venezuela, **174**; clinical symptoms in artificially infected horses, **174**; studies on eastern equine encephalomyelitis. I. Histopathology of the nervous system in the guinea pig. II. Pathogenesis. III. Intraocular infection with fixed virus, **250**.
In Ground Squirrels. Susceptibility of the "gopher", *Citellus richardsonii*, **758**, **759**.
Immunization. Chick embryo vaccine as a protective agent, **174**; preparation of chick embryo vaccine, **926**; antigenic value of formolized virus, **251**; serum protection tests, **925**; Marsh's disease after use of encephalomyelitis antiserum, **24**.
Transmission. Ticks as possible vectors, **759**.
Virus. Action of high temperature on the virus, **673**.
ENCEPHALOMYELITIS, PORCINE. Encephalomyelitis enzootica suum in Austria, **175**.
ENDOCARDITIS. See Heart, diseases.
ENDOCRINE SYSTEM. Veterinary endocrinology (review), **629**; relationship of vitamin E to the endocrine system, **546**.
See also Adrenal Gland; Hormones; Pituitary Gland; Thymus Gland; Thyroid Gland; Vitamins, vitamin C.
ENDOMETRITIS. See Uterus, diseases.
ENDOTOXINS. See Antigens.
ENTAMOEBA INFECTION. Chemotherapy of amoebicides, **959**; effect of prolonged cultivation on the pathogenicity of various strains of *E. histolytica* for kittens, **915**; experimental studies on *E. histolytica* in the dog, **915**; pathogenesis of amoebic dysentery in man and animals, **827**; experimental infection of cats with *E. coli*, **332**.
ENTERITIS, NECROTIC. See *Salmonella* Infection [Paratyphoid], in swine.
ENTEROHEPATITIS, INFECTIOUS. See *Histomonas meleagridis* Infection [Blackhead].
ENTEROTOXAEMIA. See *Clostridium* Infection, General, in sheep.
ENTOMOLOGY, GENERAL. A laboratory guide for introductory courses, **648**; principles of insect physiology, **403**.
See also Arthropod Parasites; Reports, Nyasaland, Southern Rhodesia.
ENTOZON. See Mastitis, Bovine, treatment.
ENZYMES. Enzyme action of the contents of the rumen, **137**; enzymic efficiency in deficiency diseases, **369**.
See also *Ascaris*; Helminth Parasites, physiology; Ultra-Violet Rays.
EPERYTHROZOON INFECTION. *E. ovis* infection in sheep in S. Africa, **941**.
EPHEMERAL FEVER. See Three Day Sickness, in cattle.
EPHESTIA. See Eggs, hen.
EPITHELIOMA. See Neoplasms.
EPIZOOTIC LYMPHANGITIS. See *Cryptococcus farciminosus* Infection.
EQUINE ENCEPHALOMYELITIS. See Encephalomyelitis, Equine.
EQUINE INFECTIOUS ANAEMIA. See Anaemia, Equine Infectious.
ERYSIPELOTHRIX INFECTION. Effect of sulphanilamide and sulphapyridine, **957**.
ERYSIPELOTHRIX RHUSIOPATHIAE INFECTION [SWINE ERYSIPELAS]. In a captive wild boar, **909**; in reindeer in the USSR, **654**; associated with a fatal disease in ducks, **76**; control, **324**; immunization, **494**; in veterinary students, **411**.
ERYTHROBLASTOSIS. In hatched chicks after inoculation of the allantochorion, **341**; tissue culture of virus, **341**.
ERYTHROCYTES. See Blood, corpuscles [red].
ERYTHROLEUCOSIS. See Leucosis, avian.
ESTONIA. See *Brucella* Infection, in horses; Influenza, swine.
EUROPE. See Reports.
EXANTHEMA, VESICULAR. In cattle, **777**.
EXHIBITIONS. The All-Union Institute of experimental veterinary science at the All-Union Agricultural Exhibition [U.S.S.R.], **972**; section for veterinary science, animal protection, animal insurance, and state veterinary service of the Swiss exhibition at Zurich, 1939, **971**.
EYE WORM. See *Oxyspirura*.
EYES. See also Vitamins, vitamin C.
Diseases. Protein content of the crystalline lens, aqueous humour, and vitreous body in healthy and diseased eyes of horses, **712**; lactose and galactose cataracts in rats, **955**.
See also Carcinoma; Congenital Defects; Night Blindness; *Oxyspirura*; Rabies, virus; *Rickettsia* Infection; *Toxoplasma* Infection.

F

FACTOR W. See Vitamins, vitamin B complex.
FAECES. See Helminth Parasites, diagnosis; Nematodes, general; Protozoa, general; Technique, helminthological.
"FALLING DISEASE" OF CATTLE. In Western Australia, **854**.
FASCIOLA.
General. Liver fluke, *F. gigantica*, in the lungs of goats, **846**; *F. hepatica* in hares in Bavaria, **944**; allergic tests for distomatosis, **181**; changes in portal lymph nodes, **99**.
Control. Carbon tetrachloride treatment of sheep and goats in Yugoslavia, **127**; slaked lime in the control of liver fluke snails, **522**; use of artificial manure, **522**.
FAT NECROSIS. In a gilt, **189**.
FEDERATED MALAY STATES. See Malaya.
FERRETS. See Influenza, general.
FERTILITY. Exhaustion test of fertility in the bull, **469**; fertility of sheep, **141**; factors influencing fertility of Romney Marsh rams in New Zealand, **716**.
See also Hormones, sex hormones; Insemination, Artificial; Minerals, metabolism; Sterility; Swine, general; Vitamins, vitamin E.

FIBROMA. Serological relationship of myxoma and Shope's fibroma viruses, **538**; immunity relations between the Shope fibroma virus, the myxomatosis virus and the neurolapin (pox) virus in rabbits, **27**.
FILARIAE. Filarial infections in mammals in Switzerland, **769**.
See also *Dirofilaria*; *Onchocerca*; Microfilariae; *Parafilaria*.
FILTRATE FACTOR. See Vitamins, vitamin B complex.
FILTRATION. Preparation of filter membranes, **631**; apparatus for ultrafiltration of small quantities of liquid, **145**.
See also *Clostridium* general, toxins.
FINLAND. See *Brucella* Infection, in milk; Food Inspection, general; *Mycobacterium tuberculosis* Infection, in man; Reports.
FLAVIN. See Vitamins, vitamin B_2.
FLAVONES. See Anthelmintics.
FLEAS. See *Dirofilaria*.
FLIES. See *Syngamus*.
FLOCCULATION. See *Clostridium* General, toxins.
FLUKES. See Trematodes.
FLUORESCENCE. Fluorescence analysis in ultra-violet light, **647**.
See also Pox, virus; Ultra-violet Rays; Viruses, general.
FLUORESCENCE MICROSCOPE. See Microscopy.
FLUORINE. See Poisoning, general.
FLY SPRAYS. See Repellents.
FOALS. Diseases of, **358**.
See also *Babesia* Infection [Piroplasmosis], in horses; Blood, picture; *Corynebacterium equi* Infection; Horses; Joint Ill; Rickets; *Streptococcus* Infection, in horses; *Str. equi* Infection [Strangles].
FOETUS. See Brain; Circulatory System, diseases; Embryos; Iron; *Listerella* Infection; Sulphamide Compounds, toxicity; *Vibrio foetus*.
FOOD INSPECTION.
General. Veterinary food hygiene in Sweden, Finland, Japan, Norway and Switzerland, **870**; text-book, **571**.
See also Reports, Australia, Canada; Services, veterinary.
Meat Inspection [General]. In South Australia, **788**; in the Philippines, **701**; text-book, **227**; helminths in meat inspection and their bearing on public health, **205**; demonstration of meat putrefaction by the method of Walkiewicz, **617**; condemnation of fowls of the "old hen" class, **460**.
See also Abattoirs; *Cysticercus*; Food Inspection, general.
Meat Inspection [Bacteriological]. Importance of non-specific bacteria, **291**; an anaerobic organism associated with "bone taint" in beef, **702**.
See also *Mycobacterium tuberculosis* Infection, meat inspection; *Salmonella* Infection, in meat.
Milk. See Food Inspection, general; Milk, control, hygiene.
FOOD POISONING. In Great Britain during the decade 1929-1938, **871**; chronic poisoning by foods containing cyanic substances, **59**.
See also *Salmonella* Infection, general, in eggs, in milk, in meat; *Staphylococcus* Infection, general.
FOOD PRESERVATION. Microbiology in preservation of animal tissues, **396**; of the hen's egg, **460**.
FOOT AND MOUTH DISEASE.
General. In Europe in 1937-38, **922**; in 1938-39, **506**; in Germany in 1937-38, **836**; in Denmark, 1937-39, **506**; in Switzerland, 1938-39, **506**; discussion by the Copenhagen Veterinary Society, December, 1938, **668**; lessons taught by the recent outbreak, **837**; origin of outbreak in France and the losses caused by it, **249**; report of the special committee of the Philippine Veterinary Medical Association, **87**; infection of horses, **837**; cases of healed F. & M. disease in chamois, **924**; F. & M. disease as predisposing factor in *Br. abortus* infection, **690**.
In Cattle. See Milk, control, and under other sub-headings.
Control. In Germany, Denmark and Holland, **922**; in East Prussia with the Riems vaccine, **249**; Bavarian control plan, **922**; disinfection of persons at Öresund, Sweden, **923**; Belgium: ministerial circular concerning disinfection, **669**.
See also F. & M. Disease, immunization.
In Deer. In an elk, **670**; susceptibility of fallow deer, **670**; healed disease in roe deer, **924**.
Diagnosis. Microscopic demonstration of F. & M. disease, **756**; demonstration of granular virus bodies, **923**.
Immunity. Duration after active immunization by the Riems vaccine, **757**; effect of anti-anthrax vaccination, **103**.
Immunization, 22, 509, 586; in Denmark, **666**; by virus adsorbed on aluminium hydroxide at Lindholm, Denmark, 1939, **509**; by an avirulent anisol vaccine, **334**; by convalescent whole blood, **22, 24, 250, 838**; by convalescent serum, **171**; by convalescent blood plus virus, **24**; attempt to immunize calves by injection of virus into the spinal canal, **924**; use of virus adsorbed on bone charcoal and tricalcium phosphate in immunizing g. pigs, **924**.
See also *Bacillus anthracis* Infection, general; Foot and Mouth Disease, immunity, vaccine.
In Man, 172, 587.
See also Foot and Mouth Disease, transmission.
Pathology. Lesions in the rumen, **923**; myocarditis in young lambs, **756**.
In Swine, 171, 250.
Transmission. Epidemiology, **923**; virus carriers, **668**; role of birds, **755**; virus in the intestinal contents of a human being in an infected area, **509**.
Treatment, 837; transfusion therapy, **586**; with convalescent serum, **23**.
Vaccine. Chloroform, **669**; formol, **924**; research work at Lindholm, Denmark, 1938-39, **666**.
Virulence. Influence of climate, management and feeding, **419**; influence of the nutritional state, **508**.
Virus. Viability on pastures, **586**; Peragallo's method of cultivation on the chorio-allantois, **670**.
In Wild Animals. In captivity, **22**.
FOOT ROT. In sheep, **776, 855**.
FORMALDEHYDE. Sterilization efficacy of gaseous formaldehyde, **145**.
FORMOL-GEL TEST. See *Ancylostoma*; *Leishmania* Infection, canine.
FOUADIN. See *Brucella* Infection, treatment.
FOWL CHOLERA. See Pasteurella Infection, in fowls.
FOWL LEUCAEMIA. See Leucosis, avian.
FOWL PARALYSIS, 112, 191, 279, 782, 980; nature of, **40**; in Great Britain, **692**; in a turkey, **364**; neurolymphomatosis phasianorum, **41**; breeding resistant strains of poultry, **112**; transmissibility, **781**; origin, and transmission by blood inoculation, **782**; transmission through the egg, **191**; failure of wheat germ oil to prevent lymphomatosis, **128**; attempt to produce lymphomatosis in chickens by injections with *Salmonella aertrycke* and lymphomatous nerve tissue, **364**; *Toxoplasma gallinarum* n. sp. in the retina of the fowl and its connexion with fowl paralysis, **417**.
See also Haemocytoblastosis; Leucosis, avian.
FOWL PLAGUE. In Cochinchina, **931**; in the Philippines, **27**; tissue affinities of the virus, **929**; isolation and culture, **255**; cultivation on the chorio-allantois, **842**; two strains adapted to mice, **930**.
See also Newcastle Disease.
FOWL POX. See Pox, in birds.
FOWL TYPHOID. See *Salmonella gallinarum* Infection.
FOWLS.
General. See also Eggs, hen; Slaughter.
Anatomy. See Respiratory System; Urinary System.
Arthropod Parasites. See Mites.
Bacterial Diseases. See *Brucella* Infection; *Mycobacterium tuberculosis* Infection; *Pasteurella* Infection, in fowls [fowl cholera]; *Salmonella gallinarum* Infection [Fowl Typhoid]; *S. pullorum* Infection [Bacillary White Diarrhoea].
Diseases General. In North Wales, **278**; in New South Wales, Australia, **728**; their prevention and control, **773**; on Long Island, U.S.A., **899**; discussions on poultry diseases, **646**; records of mortality at the 1938-39 Harper Adams laying trials, **359**; diseases common to game birds and domestic poultry, **774**; a hitherto undescribed poultry disease, **113**.
See also Breeding; Bronchitis, Avian Infectious; Coryza; Dermatitis, Vesicular; Erythroblastosis; Food Inspection, meat inspection [general]; Fowl Paralysis; Haemocytoblastosis; Leucosis, avian; Neoplasms; Research Institutes; Sarcoma, fowl; Services, veterinary.
Fungous Diseases. See *Aspergillus* Infection.
Helminth Parasites. See Anthelmintics; Helminth Parasites; Immunity, to metazoa.
Nutrition. Nutritional deficiency diseases of poultry, **613, 785, 864**.
See also Cannibalism; Manganese, deficiency; Perosis; Rickets; Vitamins.
Physiology. See Blood, formation, picture; Growth; Respiratory System, general; Urine; Vitamins, vitamin B_2.
Poisoning. See Atoxyl; Poisoning, metals metalloids and salts, plants; Sulphamide Compounds, toxicity.
Protozoan Diseases. See *Aegyptianella pullorum* Infection; *Eimeria* Infection [Coccidiosis]; *Leucocytozoon* Infection; *Plasmodium* Infection [malaria]; *Spirochaeta* Infection, avian; *Toxoplasma* Infection; *Trichomonas* Infection, in fowls; *Trypanosoma* Infection, general.
Virus Diseases. See Neoplasms, causation; Viruses, fowl viruses.
FOXES. See Anthelmintics; Calcium; *Clostridium botulinum* Intoxication [Botulism]; Distemper; Fertility; Helminth Parasites; Iron; Ringworm; Sterility; Vitamins, vitamin A, vitamin B_1.

FRANCAIELLA INFECTION. See *Babesia* Infection [Piroplasmosis].
FRANCE. See Army Veterinary Work ; Foot and Mouth Disease, general ; Law ; Milk, control ; *Mycobacterium tuberculosis* Infection, meat inspection, in milk ; *Onchocerca* ; Rabies, control ; Reports ; Services, veterinary.
FRENCH EQUATORIAL AFRICA. See *Ancylostoma* ; *Leishmania* Infection ; *Leptospira* Infection, general ; Protozoa, General ; *Rickettsia* Infection ; *Trypanosoma evansi* Infection.
FRENCH WEST AFRICA. See Horse-Sickness, African ; Poisonous, plants ; Rinderpest, general ; Services, veterinary.
FUNGI, GENERAL. Effects of surface tension and osmotic pressure on pathogenic fungi, **18** ; destruction of nematode larvae by predatory fungi, **594**, **848**.
See also Actinomycosis ; *Aspergillus* ; *Mycotoxin* ; Parasitic Infestation, general ; Ringworm ; *Proactinomyces*.
FUR ANIMALS. Diseases and breeding errors, **531**.
See also Distemper, virus ; Foxes ; Mink ; Rabbits ; Raccoons ; Vitamins, general, vitamin A.
FUSIFORMIS. Isolation of *Bacterium necrophorum* in the presence of *Proteus*, **82** ; effect of sulphanilamide on infection in rabbits, **55**.

G

GALL-BLADDER. See Bacteria General, flora of organs and tissues.
GAMBIA. See Reports ; Rinderpest, immunization.
GAME. See Wild Animals and Birds.
GAPEWORMS. See *Syngamus*.
GAS GANGRENE. See *Clostridium* Infection, in cattle.
GASES, POISONOUS. Effects of war gases on animals, **485**, **635** ; therapy by intravenous injections of dextrose of pulmonary oedema et dogs poisoned by phosgene, **128** ; treatment of bleeding skin wounds contaminated by mustard gas, **965** ; treatment with Besredka's antivirus, **128**.
See also Air Raid Precautions.
GASTRITIS, PARASITIC. See Stomach Worms.
GASTRO-ENTERITIS, FELINE INFECTIOUS, 176, 425 treatment with phenylamine sulphamide, **295**.
GASTROPHILUS. See Oestridae, bots.
GEESE. See Liver.
GENETICS. Text-books, **311**, **404**, **486**, **902**.
See also Breeding ; Heredity.
GENITAL SYSTEM.
General. See also Breeding ; Fertility ; Hormones, sex hormones ; Insemination, Artificial ; Oestrus ; Ova ; Ovary ; Placenta ; Pregnancy ; Spermatozoa ; Vagina ; Vitamins, vitamin B_2.
Diseases. Inheritance of pathological changes in genital organs of cattle, **190**.
See also Abortion ; *Brucella* Infection ; *Clostridium* Infection, in cattle ; Mastitis, bovine ; Neoplasms, general ; Nymphomania ; Pregnancy, diseases ; Seminoma ; Sterility ; *Trichomonas* Infection, in cattle ; Uterus, diseases.
Transmission of Infection By. See Influenza, in horses ; Viruses, general.
GERMANIN (BAYER 205). Studies on Bayer 205 (Germanin) and antrypol. III. Method of determination and retention of the drug in the animal body, **211** ; —. IV. Retention of the drug in the animal body, **554** ; mode of action, **125** ; toxicity tests with germanin (Bayer 205) and similar products, melanyl (Fourneau 309) and belganyl, **959**.
See also Naganol ; *Trypanosoma* Infection, treatment.
GERMANY. Livestock diseases in, **570**, **725**.
See also Anaemia, Equine Infectious ; *Babesia* Infection, in cattle ; *Brucella* Infection, control ; Encephalomyelitis, Porcine ; *Fasciola* ; Foot and Mouth Disease ; Jaagsiekte ; Leucosis, bovine ; Milk, bacterial content, control ; *Mycobacterium tuberculosis* Infection, in calves, meat inspection, in swine ; Oestridae, warbles ; *Pasteurella pseudotuberculosis* Infection ; Pica ; Reports ; Research Institutes ; *Salmonella* Infection, general ; Services, veterinary ; Wild Animals and Birds.
GIZZARD EROSION FACTOR. See Vitamins, vitamin B complex.
GLANDERS. See *Pfeifferella mallei* Infection.
GLOSSINA. Species in Ilorin Province, Nigeria, **96** ; survey of tsetse flies in Nyasaland, **843** ; control of tsetse fly, **520** ; reduction of *G. pallpalis* in Kenya by the "block" method, **521** ; control of tsetse in Zululand by trapping, **520** ; development of *Trypanosoma gambiense* and *T. congolense* in *Glossina*, **828** ; transmission of *T. gambiense* by, **413**.
See also *Trypanosoma* Infection.
GLOSSITIS. In horses feeding on Swedish clover (*Trifolium hybridum*), **837**.
GLUCOSIDE VACCINES. See *Bacillus anthracis* Infection, immunization ; Rinderpest, immunization ; Vaccines.
GLUTHATHIONAEMIA. In horses injected with bacterial toxins and animal poisons, **601**.
See also Blood, chemical composition.
GLYCAEMIA. See Vitamins, vitamin B_1.
GOATS.
Arthropod Parasites. See Myiasis ; Oestridae, warbles.
Bacterial Diseases. See *Brucella* Infection ; *Corynebacterium ovis* Infection [Caseous Lymphadenitis] ; *Listerella* Infection ; Milk, bacterial content ; *Mycobacterium tuberculosis* Infection ; *Pfeifferella mallei* Infection [Glanders], general.
Diseases General. Problems in goat dairies, **440** ; a disease of goats near Bogota in 1935, **189**.
See also Congenital Defects ; Pleuro-Pneumonia ; Purpura.
Genital System. See Ova.
Helminth Parasites. See Helminth Parasites, of Goats.
Nutrition. See Calcium, deficiency ; Copper, deficiency ; Vitamins, vitamin E.
Physiology. See Blood, chemical composition ; Milk, chemical composition.
Poisoning. See Poisoning, plants.
Protozoan Diseases. See *Babesia* Infection [Piroplasmosis] ; *Eimeria* Infection [Coccidiosis] ; *Trypanosoma* Infection, in ruminants.
Virus Diseases. See Pox, in goats.
GOLD COAST. Livestock diseases in, **307**.
See also Reports.
GOLUBATZ MIDGE. See *Danubosimulium*.
GOPHERS. See Ground Squirrels.
GOSSYPOL. See Poisoning, plants.
GRANULOMA. Roeckl's granuloma in zebu cattle, **110**.
GRASS SICKNESS. Of horses and game preservation, **442** ; blood picture, **775** ; chemical composition of blood, **775**.
GRASS TETANY. Hypocalcaemia, grass tetany or grass staggers in sheep, **119** ; adrenal gland lesions in two cases, **277**.
GRAVIDAN. See Pleuro-Pneumonia, in goats.
GREAT BRITAIN. Important diseases of animals in England, **943**.
See also Arthritis ; Biological Products, standardization ; *Brucella* Infection, in horses ; Commissions ; Committees ; *Eimeria* Infection [Coccidiosis], in sheep ; Food Poisoning, general ; Fowl Paralysis ; Fowls, diseases general ; Helminth Parasites, of sheep ; Mastitis, bovine ; Milk, diseases transmitted by, hygiene ; *Mycobacterium tuberculosis* Infection, control, in man, meat inspection ; Newcastle Disease ; Pine Disease ; Psittacosis ; Reports ; *Salmonella* Infection, in milk ; *Salmonella gallinarum* Infection [Fowl Typhoid] ; Services, veterinary ; Ticks.
GREECE. See *Echinococcus*.
GROUND SQUIRRELS. See Encephalomyelitis, Equine.
GROUSE. See Helminth Parasites.
GROWTH. Skeletal development of the fowl to six weeks of age, **384** ; effect of caecectomy on growth of chicks, **330**.
See also *Bacteria* General, growth ; Pituitary Gland, growth hormone ; Swine, general ; Vitamins, vitamins B_2, vitamin B complex.
GUADELOUPE. See Ticks.
GUINEA FOWLS. See *Capillaria*.
GUINEA PIGS. Highly fatal disease of, **948**.
See also *Bacterium tularense* Infection [Tularaemia] ; *Eimeria* Infection [Coccidiosis] ; Muscles, diseases ; *Mycobacterium tuberculosis* Infection, general ; *Pasteurella pseudotuberculosis* Infection ; *Streptococcus* Infection.

H

HABRONEMA. Treatment of "summer sores" in horses by local freezing, **795**.
HAEMAPHYSALIS. See Ticks.
HAEMATOBIA. See *Lyperosia*.
HAEMATOLOGY. See Blood.
HAEMOCYTOBLASTOSIS. In the chicken, **952**.
See also Fowl Paralysis ; Leucosis, avian.
HAEMOGLOBIN. See Blood, haemoglobin ; Muscles.
HAEMOGLOBINAEMIA. Parturient haemoglobinaemia of dairy cows, **695** ; caused by phosphorus deficiency, **695** ; phosphorus and cholesterin content of the blood in, **541**.
See also Haemoglobinuria.
HAEMOGLOBINURIA. Aetiology and therapy of equine enzootic haemoglobinuria, **947** ; haemoglobinuria and haemoglobinaemia in cattle in Drenthe, Holland, **945** ; redwater in cows after calving, **695**.
HAEMONCHUS. Sterile culture of the free-living stages of *H. contortus*, **265** ; anthelmintic efficiency against immature *H. contortus*, **555** ; efficiency of copper sulphate against *H. contortus*,

HAEMONCHUS [cont'd].
875 ; of copper sulphate and carbon tetrachloride against *H. contortus* in adult sheep, **875**, **876**.
HAEMOPHILUS GROUP. A growing yeast medium for the cultivation of haemophilic bacilli, **473**.
HAEMOPHILUS INFLUENZAE. Two serologically active protein fractions of, **494** ; the specific polysaccharide of *H. influenzae*, type B, **412**.
See also Influenza, Swine.
HAEMORRHAGE. See Anaemia, treatment ; Blood, chemical composition.
HAEMORRHAGIC SEPTICAEMIA. See *Pasteurella* Infection.
HAEMOSIDERIN. See Anaemia, Equine Infectious, diagnosis.
HAIR. See Skin.
HAMSTERS. See *Mycobacterium*, general ; *Mycobacterium tuberculosis* Infection, general.
HARES. P.M. examinations of dead hares in Bavaria, **944**.
See also *Bacterium tularense* Infection [Tularaemia] ; Helminth Parasites, of hares ; *Pasteurella pseudotuberculosis* Infection ; Shock Disease.
HAWAII. See *Hymenolepis* ; Reports ; *Subulura*.
HEART.
General. Physiology of cardiac function, **386**.
Diseases. Experimental endocarditis in dogs, **46** ; nature of vegetations of bacterial endocarditis, **111**.
See also *Dirofilaria* ; Foot and Mouth Disease, pathology ; Viruses, rabbit viruses.
HEARTWATER. See *Rickettsia* Infection.
HEARTWORM. See *Dirofilaria*.
HELMINTH PARASITES.
General. Of Australia : a bibliography with alphabetical lists of authors, hosts and parasites, **680** ; research in India, **681** ; considerations on parasitism in helminths, **681**.
See also Parasitic Infestation, general.
Of Buffaloes. See *Moniezia* ; Nematodes, general ; *Schistosoma* ; Trematodes, general.
Of Cats. See *Joyeuxiella* ; *Mesocestoides* ; *Trichinella* Infection, general.
Of Cattle. Gastro-intestinal helminths in apparently healthy cattle in Queensland, Australia, **31** ; bovine blood picture in health and under parasitism, **214**.
See also *Capillaria* ; *Onchocerca* ; *Strongyles* ; *Strongyloides*.
Chemical Composition. See *Cysticercus*.
Control. Principles of parasite control, **729** ; of parasites of domestic animals, **58** ; pasture hygiene with respect to parasitic diseases, **180** ; economic method of combating helminthiasis in ruminants, **934** ; in sheep, **844**.
See also Anthelmintics, under other sub-headings, and under name of helminth.
Cultivation. Attempts to culture helminths of vertebrates in artificial media, **353**.
See also *Ascaris* ; *Haemonchus*.
Diagnosis. Comparative efficiency of various techniques for diagnosis in faeces, **394** ; diagnosis by means of egg counts, **596** ; economical method for P.M. examination, **933** ; specificity of the Casoni-Botteri reaction, **181**.
See also *Ancylostoma*; *Ascaris* ; *Echinococcus* ; *Fasciola* ; Strongyles ; *Trichinella* Infection, diagnosis.
Of Dogs. In Surinam, **31** ; spleen of dogs with helminthiasis, **360**.
See also *Ancylostoma* ; Anthelmintics ; *Diphyllobothrium* ; *Dirofilaria* ; *Mesocestoides* ; Microfilariae ; *Paragonimus* ; Parasitic Infestation, general ; *Spirocerca* ; *Strongyloides* ; *Taenia* ; *Trichinella* Infection, general ; *Trichuris*.
Eggs. See *Ascaridia* ; Ascarids ; *Ascaris* ; *Capillaria* ; Helminth Parasites, viability ; *Schistosoma* ; *Strongylus* ; Technique, helminthological ; *Trichuris*.
Of Fowls. In Yugoslavia, **346** ; in India, treatment and control, **933**.
See also Anthelmintics ; *Ascaridia* ; *Capillaria* ; Cestodes ; *Heterakis* ; *Hymenolepis* ; Immunity, to metazoa ; *Oxyspirura* ; *Raillietina* ; *Subulura* ; *Syngamus*.
Of Foxes. See Anthelmintics ; Ascarids ; *Capillaria* ; *Trichinella* Infection, general.
Of Goats. See *Fasciola* ; Nematodes, general ; *Schistosoma* ; Trichostrongyles ; *Trichostrongylus*.
Of Grouse, 345.
Of Guinea Fowls. See *Capillaria*.
Of Hares. See *Fasciola* ; *Trichostrongylus*.
Of Horses. In India, treatment and control, **844** ; in the Philippines, **683**.
See also *Dictyocaulus* ; *Echinococcus* ; *Habronema* ; Microfilariae ; *Onchocerca* ; *Parafilaria* ; Parasitic Infestation, general ; Phenothiazine ; Strongyles ; *Strongylus* ; *Trichonema* ; Trichostrongyles.
Immunity. See Immunity, to metazoa.
Immunization. See *Cysticercus*.
Life History. See *Capillaria* ; *Cittotaenia* ; *Cooperia* ; *Dirofilaria* ; *Moniezia* ; *Raillietina* ; *Strongyloides* ; *Strongylus*.
Of Man. See *Echinococcus* ; Food Inspection, meat inspection ; *Trichinella* ; *Trichostrongylus*.
Nutrition in Relation to. Effect of diet on resistance to parasitic infestation, **934** ; effect of mineral deficiencies on helminthiasis of ruminants, **378**.
See also *Ascaridia*.
Of Pheasants. See *Capillaria*.
Physiology. See *Ascaris* ; Cestodes, general ; Nematodes, general.
Of Pigeons. See *Capillaria* ; *Cotylurus* ; *Ornithostrongylus*.
Of Rabbits. See *Trichostrongylus*.
Of Ruminants. See Anthelmintics ; Helminth Parasites, control, nutrition in relation to ; Strongyles.
Of Sheep. In Scotland, **680** ; of hill sheep, Scotland, **844** ; of lambs on a Scottish border farm, **768** ; of sheep in Uruguay, **32**.
See also Anthelmintics ; *Cooperia* ; *Cysticercus* ; *Dicrocoelium* ; *Dictyocaulus* ; *Fasciola* ; *Haemonchus* ; Helminth Parasites, control ; Lungworms ; *Moniezia* ; Nematodes, general ; *Nematodirus* ; *Oesophagostomum* ; Paramphistomes ; Phenothiazine ; *Protostrongylus* ; *Schistosoma* ; *Strongyloides* ; *Synthetocaulus* ; Technique, helminthological ; Trichostrongyles ; *Trichostrongylus*.
Staining. See Technique, helminthological.
Of Swine, 430 ; in Venezuela, **432** ; parasites in slaughter houses in Canton. I. Helminths of Kwangtung hogs, **429**.
See also *Ascaris* ; *Brachylaemus* ; *Cysticercus* ; *Echinococcus* ; *Hyostrongylus* ; Lungworms ; Stomach Worms ; *Tridinella* infection.
Technique. See Technique, helminthological.
Toxins. Modern views on the toxicity of helminths, **30**.
See also *Ascaris* ; *Taenia*.
Treatment. See Anthelmintics ; Phenothiazine, and under name of helminth.
Of Turkeys. See *Capillaria*.
Viability. Effects of rain and sun on survival of eggs and larvae under tropical conditions, **31**.
See also *Ascaridia* ; *Capillaria*.
Of Wild Animals and Birds. Of wild animals, **180**.
See also Lungworms ; Nematodes, general.
HEPARIN. See Blood, coagulation.
HEPATOMA. Malignant hepatoma in the white-tailed deer, *Odocoileus osceola*, **694**.
HEREDITY. See Congenital Defects ; Diseases, inherited ; Genetics ; Lethal Factors, hereditary ; *Mycobacterium tuberculosis* Infection, immunity ; Neoplasms, heredity.
HETERAKIS. Occurrence of *H. gallinae* in fowls and its relations to disease, breed and other helminths, **596**.
HETERODENDRON OLEAEFOLIUM. See Poisoning, plants.
HIDES. See *Bacillus anthracis* Infection, control ; Ticks, general.
HIRUDIN. See Blood, coagulation.
HISTAMINE. Histaminase treatment of histamine shock in g. pigs, **446**.
HISTOLOGY. Structure of the basement membrane, **132**.
See also Mange ; Pathology ; Research, general ; Technique, histological.
HISTOMONAS MELEAGRIDIS INFECTION [BLACKHEAD], 916 ; control in turkeys, **583** ; blood alterations in turkeys, **169** ; new arsenical preparations in treatment, **377** ; *Mycotorula albicans* a cause of blackhead, **583**.
HOECHST 6678. See Surfen C.
HOG CHOLERA. See Swine Fever.
HOLLAND. Livestock diseases in, **480**.
See also Actinomycosis ; *Bartonella* Infection ; Diarrhoea ; *Echinococcus* ; Foot and Mouth Disease, control ; Haemoglobinuria ; *Mycobacterium johnei* Infection [Johne's Disease] ; *Mycobacterium tuberculosis* Infection, control, in man, meat inspection ; Occupational Diseases ; Public Health ; Reports ; *Trichonema*.
HONG KONG. Animal diseases in, **725**.
See also Reports.
HOOF DISEASE OF REINDEER. See *Erysipelothrix rhusiopathiae* Infection [Swine Erysipelas].
HOOKWORMS. See *Ancylostoma*.
HORMONES.
General, 388 ; report of the third international conference on the standardization of hormones, Geneva, 1938, **720** ; the new endocrinology. I. The pituitary. II. Chemistry of the sterols. III. The male sex hormones. IV. The female sex hormones, **389**.
See also Endocrine System ; Mammary Gland ; Pituitary Gland.
Sex Hormones. Relation to calcium metabolism and to the parathyroid glands, **142** ; relation to infection, **716** ; kidneys and sex hormones, **968** ; influence of gonadotrophic hormones on the ovaries of dogs, cattle and pigs, **300** ; gonadotrophic hormone

HORMONES—Sex Hormones [cont'd].
in the non-pregnant mare, **391**; hormone content of the urine of pregnant mares, **471**; progesterone in the urine of pregnant cows, **391**; pituitary and urine forms of prolan, **142**; trials of prolan in oil, **878**; induction of abortion in the cow by inunction with stilboestrol dipropionate, **391**; cyclic variation in response to injected oestrone, **62**; mechanism of oestrogenic activity, **216**; effect of oestrin on corpus luteum function, **390**; maintenance of pregnancy in hypophysectomized rabbits by administration of oestrin, **390**; gonad-stimulating hormones of placental origin, **390**.
See also *Cysticercus*; Hormones, general; Neoplasms, endocrine system in relation to; Oestrus; Sterility, treatment.
Therapy. See Adrenalin.
HORN-FLY. See *Lyperosia*.
HORSE-SICKNESS, AFRICAN. In South Africa, **940**; prophylaxis in French West Africa, **513**; propagation of the virus in the developing chick embryo, **89**.
HORSES.
General. See also Foals; Identification of Animals.
Anatomy. See Teeth.
Arthropod Parasites. See *Lyperosia*; Oestridae, bots; Parasitic Infestation, general.
Bacterial Diseases. See Bacteria General, toxins; *Bacterium equirulis*; *Brucella* Infection; *Clostridium* Infection, General; *Mycobacterium tuberculosis* Infection; *Pfeifferella mallei* Infection [Glanders]; *Salmonella* Infection; *Streptococcus* Infection.
Diseases General. Results of autopsies of horses during 1928-38 at the Veterinary College at Zagreb, Yugoslavia, **772**; contagious diseases of the horse under wartime conditions, **604**; an obscure equine disease with high mortality, **275**.
See also Arthritis; Blood, serum; Brain, diseases; Circulatory System, diseases; Emphysema; Eyes, diseases; Glossitis; Grass Sickness; Lipoma; Lymphatic System, diseases; Navicular Disease; Neuroma; Paraplegia; Schweinsberg Disease.
Fungous Diseases. See Parasitic Infestation. general.
Genital System. See Abortion; Hormones, sex hormones; Nymphomania; Ovary; Pregnancy, diagnosis; Sterility.
Helminth Parasites. See Helminth Parasites, of horses; Parasitic Infestation, general; Phenothiazine.
Nutrition. See Blood, chemical composition; Bones, diseases; Haemoglobinuria; Muscles, diseases; Nutrition, diseases in relation to; Tetany.
Physiology. See Blood, chemical composition, picture; Digestive System, general; Immunity, general; Urine.
Poisoning. See Glutathionaemia; Poisoning, plants; Selenium.
Protozoan Diseases. See *Babesia* Infection [Piroplasmosis]; Parasitic Infestation, general; *Trypanosoma* Infection, treatment; *T. equinum* Infection [Mal de Caderas]; *T. equiperdum* Infection [Dourine]; *T. hippicum* Infection [Murrina].
Virus Diseases. See Viruses, horse viruses.
HOTIS TEST. See Mastitis, Bovine, diagnosis.
HOYA AUSTRALIS. See Poisoning, plants.
HUNGARY. See *Babesia* Infection [Piroplasmosis], in sheep; *Brucella* Infection, in cattle, in horses; *Mycobacterium tuberculosis* Infection, control, in fowls; *Parafilaria*; Rabies, immunization; Reports; *Salmonella gallinarum* Infection [Fowl Typhoid].
HYALOMMA. See Ticks.
HYBRIDS. Zebu (Brahman) cross cattle and their possibilities in Queensland, Australia, **564**.
See also Sterility, general.
HYDATID DISEASE. See *Echinococcus*.
HYDROCEPHALUS. See Brain, diseases.
HYDROCYANIC ACID. See Poisoning, cyanide.
HYDROGEN-ION CONCENTRATION. Determination of pH values of biologic fluids, **474**; use of indicator papers for determining pH of urine, faeces, bacteriological media, milk, meat, and meat extract, **371**; valve potentiometer and its application to pH determination, **217**.
See also Bacteria General, flora of organs and tissues; Digestive System, general; Myiasis; Rumen; *Strongylus*; Vagina; Viruses, viability.
HYDROGEN PEROXIDE. See Anthelmintics.
HYMENOLEPIS. Life history of *H. exigua*, a cestode of poultry in Hawaii, **99**; effects of number and age of worms on *H. diminuta* in rats, **847**.
HYOSTRONGYLUS. Infections of swine with the red stomach worm *H. rubidus*, **849**.
HYPOCALCAEMIA. See Calcium, deficiency; Milk Fever.
HYPODERMA. See Oestridae, warbles.
HYPOPHYSIS. See Pituitary Gland.
HYSTERIA, CANINE. Is running fits a deficiency disease? **286**.

I

ICELAND. See Adenoma.
ICTERUS. See Jaundice.
IDENTIFICATION OF ANIMALS. Tattooing as a means of marking stock, **475**; identification of horses by impressions of the palate, **147**.
IMMUNITY, GENERAL.
General. Immunity to infectious diseases, **484**; quantitative studies on the neutralization of pathogenic agents in tissues by circulating antibodies. I. Time-factors, **38**; —. II, III, and IV, **436**; ferment theory of immunity, **602**; non-specific resistance to infection, **37**; ease of body heat loss and resistance to infection, **606**; influence of climate on constitution, power of resistance and yield of domestic animals: acclimatization, **395**; constitution, power of resistance, and work capacity of acclimatized horses, **395**.
See also Allergy; Anaphylaxis; Antitoxins; Neoplasms.
To Bacteria. Active immunity against an intestinal and a respiratory infection, **37**.
See also Antigen-Antibody Reactions; and under name of specific bacterial disease.
To Metazoa, 104; immunology of helminth infections, **845**; resistance of chickens to parasitic worms, **767**; goblet cells and age resistance of animals to parasitism, **431**.
See also Cestodes, general; Hormones, sex hormones; Myiasis; Nematodes, general; and under name of parasite.
Nutrition in Relation To. Relationship of the diet to the self-regulatory defense mechanism, **242**.
See also Nutrition, diseases in relation to; Vitamins, vitamin A.
To Protozoa. See under name of specific protozoan disease.
To Viruses. Non-specific resistance (para-immunity) in virus diseases, **103**; immunity relations between the Shope fibroma virus, the myxomatosis virus and the neurolapin (pox) virus in rabbits, **27**.
See also Antigens, and under name of specific virus disease.
IMMUNIZATION. Prophylactic inoculation during the incubation period, **528**; "concentrated" antitoxic immunization without the addition of stimulating substances to the antigen, **39**.
See also Anaphylaxis, and under name of specific disease and organism.
IMPOTENCE. See Sterility.
INCLUSION BODIES. See Distemper, in dogs; Pox, virus.
INDIA. Animal diseases in, **722**; research, **307**.
See also Actinobacillosis; Actinomycosis; Animal Husbandry; Arthropod Parasites, general; *Babesia* Infection [Piroplasmosis], in dogs; Bones, diseases; *Clostridium chauvoei* Infection [Blackleg]; Conferences; Congenital Defects; Congresses; Deg-Nala Disease; Diseases, General; Dogs, diseases general; Education; Helminth Parasites, general, of fowls, of horses; *Joyeuxiella*; *Leptospira* Infection, general; *Mesocestoides*; Microfilariae; *Mycobacterium johnei* Infection [Johne's Disease]; *Mycobacterium tuberculosis* Infection, diagnosis; Myiasis, in sheep; Oestridae, warbles; *Ornithostrongylus*; Paramphistomes; Pleuro-Pneumonia, bovine contagious; Pox, in birds; Rabies, immunization; Repellents; Reports; Research, general; Rinderpest, immunization; *Schistosoma*; Services, veterinary; *Syngamus*; Ticks, general; *Trypanosoma evansi* Infection [Surra].
INDOCHINA. See *Dirofilaria*; Fowl Plague; *Pasteurella* Infection, in buffaloes, in cattle, in swine; Reports; Rinderpest, immunization; Swine Fever, immunization.
INFARCTION. Genesis of, **111**.
INFECTION, RESISTANCE TO. See Immunity.
INFECTION ROUTES. Infection of air; bacteriologic and epidemiologic factors, **397**; blood and lymph vascular systems of the intestine as infection atria: the portal vein capillaries, **395**.
See also Genital System, transmission of infection by; Respiratory System, introduction of infection by.
INFERTILITY. See Sterility.
INFLAMMATION, 607; the lymphocyte in acute inflammation, **279**.
INFLUENZA.
General. Virus influenza in ferrets, **841**; periodicity of human influenza, **92**; heated elementary body suspensions in immunization, **426**; effect of passive immunization, **338**; effect of foreign tissue extracts on efficacy of vaccines, **173**; antigenic differences in strains of epidemic influenza virus. I. Cross-neutralization tests in mice. II. Cross-immunization tests in mice, **931**; neutralization of epidemic virus, **26**.
In Cats. See Bacteria General, haemophilic; *Pasteurella* Infection, in cats.
In Horses, 532; due to virus carriers, **173**.
INFLUENZA, SWINE. In Estonia, **91**; in Algeria, **761**; aetiology, **426**; antibody responses, **761**; effect of *H. influenzae-suis* vaccines

INFLUENZA, SWINE [cont'd].
on swine influenza, **516**; serological studies of the virus, **761**; cultivation on the chorio-allantois, **92**; an intermediate host for, **761**.
See also Arthritis; Bronchopneumonia.
INSECTICIDES. Trials of "206 Dr Utzel" and "D.V.50 Phoenix", **58**; terpene ethers in pyrethrum and rotenone fly sprays, **794**.
See also Derris; Pyrethrum; Repellents; Reports, Australia; and under name of specific group of arthropod parasites.
INSECTS, GENERAL. See Arthropod Parasites; Entomology.
INSEMINATION, ARTIFICIAL. Use in the fight against bovine sterility, **720**; survival of semen stored in thermos flasks, **720**.
INSPECTION OF FOOD. See Food Inspection.
INSTITUTES. See Reports; Research Institutes.
INSULIN. See Milk Fever.
INTESTINES.
General. Serosal and mucosal dimensions of the dog's small intestine, **385**; absorption of water from salt solution in the large intestine of ruminants, **213**.
See also Digestive System, general.
Diseases. Primary histological lesion of regional ileitis: significance of the giant cells, **445**.
See also Adenoma; Diarrhoea.
Flora. See Bacteria General, flora of organs and tissues.
INVERTEBRATE VECTORS OF DISEASE. See Anaemia, Equine Infectious, transmission; *Anaplasma* Infection; *Babesia* Infection [Piroplasmosis]; *Bacillus anthracis* Infection, transmission; *Bacterium tularense* Infection [Tularaemia]; *Dirofilaria*; *Glossina*; Horse-Sickness, African; Mosquitoes; *Syngamus*; *Theileria* Infection; Ticks; *Trypanosoma cruzi* Infection [Chagas' Disease]; *T. evansi* Infection [Surra].
IODINE. An iodine survey of New Zealand live stock, **954**.
See also Actinomycosis; Anthelmintics.
IRAN. Livestock diseases in, **971**.
See also Services, veterinary; *Theileria* Infection.
IRAQ. See *Brucella* Infection, general.
IRISH FREE STATE. See Eire.
IRON. Absorption, **796**; absorption and excretion, **696**; excretion of radioactive iron in urine, bile and faeces, **798**; fate of large doses of iron adminstered by mouth, **696**; iron transportation and metabolism, **696**; iron content of the liver and lungs of cattle, calves and the bovine foetus, **712**; iron content of the livers of silver foxes, **613**.
See also Anaemia, treatment.
Deficiency. A cause of stillbirth in swine, **284**.
See also Anaemia.
IRRADIATION. See Radioactive Isotopes; Radon; Ultra-Violet Rays; X-Rays.
ISOSPORA INFECTION [COCCIDIOSIS]. Of domestic animals in Uruguay, **415**; of dogs, **169**; in China, **678**.
ITALY. Livestock diseases in, **570**.
See also Agalactia, contagious; Army Veterinary Work; *Brucella* Infection, in man; Reports.
IXODES. See Ticks.

J

JAAGSIEKTE, and *Strongylus*-adenomatosis of sheep's lungs in Germany, **274**.
See also Adenoma.
JAMAICA. Livestock diseases in, **643**.
See also Reports.
JAPAN. See *Clonorchis*; Food Inspection, general; *Lyperosia*; *Toxoplasma* Infection.
JAUNDICE. Icterus neonatorum in man and neonatal bilirubinaemia in domestic animals, **41**.
JAVA. See *Brucella* Infection, diagnosis [serological].
JETTING OF SHEEP. See Myiasis, in sheep.
JOHNE'S DISEASE. See *Mycobacterium johnei* Infection.
JOINT ILL. In foals, **358**.
See also Arthritis.
JOINTS. Influence of the nervous system on bone and joints, **466**.
See also Arthritis.
JOYEUXIELLA. From a cat in India, **682**.

K

KENYA. Livestock diseases in, **811**; research on tropical and subtropical diseases, **941**.
See also *Glossina*; Nairobi Sheep Disease; Reports; Research Institutes; Rift Valley Fever; Rinderpest, general; Swine Fever, general; Theileria Infection.
KERATITIS. Contagious keratitis in cattle, **947**.
See also Pox, virus.
KETOSIS. Ketonaemia and pregnancy disease in pregnant ewes, **540**; distribution of ketone bodies in tissues, **712**; ketone body: total carbohydrate utilization ratios and ketosis, **195**; effect of increased metabolism on ketosis of depancreatized dogs, **540**; anterior pituitary hormones in the treatment of ketosis in the dairy cow, **795**.
KIDNEYS. See also Hormones, sex hormones; Urinary system.
Diseases. Function tests of normal and diseased kidneys in horses, **298**; bovine kidney in health and disease, **108**; renal dwarfism in a calf, **535**; pathogenesis of large white kidneys in cattle, **534**; "inflammatory shrunken kidney" of the dog, **42**.
See also Nephritis; Urinary System, diseases.
KITTENS. See Blood, corpuscles [general]; Cats.
KOREA. See *Capillaria*.
KUDUS. See *Mycobacterium tuberculosis* Infection, in wild animals and birds.

L

LABORATORIES. See Reports; Research Institutes.
LACHESIS VENOM. See *Clostridium* Infection, General, treatment.
LAMBS. See Arthritis; *Bacterium coli* Infection; *Clostridium* Infection, General, in sheep; *Clostridium tetani* Infection; *Eimeria* Infection [Coccidiosis], in sheep, treatment; Foot and Mouth Disease, pathology; Helminth Parasites, of sheep; Paralysis, tick; Paraplegia; Sheep; Stiff Lamb Disease; Swayback; White Muscle Disease.
LAMENESS. See Bones, diseases.
LARYNGO-ENTERITIS, INFECTIOUS. Of cats, **779**; transmissible to raccoons, **27**.
LARYNGOTRACHEITIS, AVIAN, 278; preventive vaccination, **763**; viability and immunizing value of egg-propagated virus, **339**.
LAW.
General. Survey of laws about the sale of remedies for animal diseases, **721**.
France. Decree concerning state-aided control of bovine tuberculosis, **575**; legally contagious forms of bovine TB., **650**; law concerning sale of milk from cows with foot and mouth disease, **508**; decree of 26th April, 1939, relating to control of pasteurization plants, **870**; decree of 28th April, 1939, relating to the sale of raw milk for human consumption, **870**; law regarding control of rabies, **672**.
Great Britain. Amendment to Therapeutic Substances Act (1925), regarding preparation of tetanus toxoid and *Cl. histolyticum* antitoxin, September, 1939, **889**.
Portugal. Law of 23rd November, 1935, on the prophylaxis of animal tuberculosis, **7**.
LEAD. See Poisoning, metals metalloids and salts.
LEISHMANIA. Tissue culture, **499**.
LEISHMANIA INFECTION.
General. Comparative study of human and animal, **831**; diagnosis, **831**; Nattan-Larrier's method for serological diagnosis, **185**.
Canine. In Crete, **917**; control in Crete, **832**; epidemic significance, **499**; diagnosis by the formol-gel test in the French Congo, **772**; spleen of dogs with leishmaniasis, **360**; development in Chinese sandflies fed on dogs with canine leishmaniasis, **832**.
LENTIN. See Anthelmintics.
LEPTOSPIRA INFECTION.
General, 333, 504; in French Equatorial Africa, **664**; in the rat population of Calcutta, **835**; classification of *Leptospira*, **504**; infection of the fowl embryo with *L. icterohaemorrhagiae*, **419**.
Diagnosis. Serological tests, **170**; for Weil's disease, **356, 939**; diagnosis of Stuttgart disease, **920**.
In Dogs. In Denmark, **21, 504**; blood chemistry in uraemia of Stuttgart disease, **835**; new discoveries concerning, **21**; treatment of Stuttgart disease, **920**; with "leptosprit", **794**.
See also *Leptospira* Infection, diagnosis.
LETHAL FACTORS, HEREDITARY. Contraselection, **106**; new lethal mutation in the rat, **535**.
See also Congenital Defects; Diseases, Inherited.
LEUCAEMIA. See Leucosis.
LEUCOCYTES. See Blood, corpuscles [white].
LEUCOCYTOZOON INFECTION. Effect of schizogony of *L. galli* on the spleen of fowls, **20**; *L. smithi* in turkeys in the U.S.A., **170**; of turkeys transmitted by *Simulium nigroparvum*, **20**.
LEUCOSIS.
General, 950; of mammary region in sows, **536**; resistance to transmissible leucaemia, **192, 859**; influence on metabolism of uninfiltrated lymphoid tissue, **951**; myeloid chloroleucaemia in a pig, **950**.
Avian. Present status of fowl leucosis (fowl paralysis), **781**; transmission of erythroleucosis in young chickens, **953**; transmission of avian leucosis, **452**; fowl leucosis. IV. Symptoms

LEUCOSIS—Avian [cont'd].
and pathology. V. Transmission experiments, **340**; protein content of serum of hens inoculated with leucaemia, **453**; immunization by intradermal injection of the virus, **452**; formation of tumours by intradermal inoculation of the virus, **452**; a polysaccharide in tumours due to the virus, **953**; chemical and immunological studies on the virus, **858**; X-ray resistance of the virus, **783**; leucosis in budgerigars, **952**.
See also Erythroblastosis; Fowl Paralysis; Haemocytoblastosis; Lymphomatosis.
Bovine. In domestic animals in Germany, **40**, **949**; transmissibility, **858**.
LEVANT. Livestock diseases in, **224**.
See also Reports.
LICE. Nutrition and egg deposition, **429**; biology of the dog louse, *Linognathus setosus*, **932**.
See also Swine Fever, transmission.
LICHEN TROPICUS. See Microfilariae.
LIGHT. Daylight in relation to climate and health, **43**.
LILY OF THE VALLEY. See Poisoning, plants.
LINGUATULA. Life-cycle of *L. rhinaria*, **933**.
LINITIS PLASTICA. See Stomach, diseases.
LINOGNATHUS. See Lice.
LINSEED. See Poisoning, cyanide.
LIPOMA. Of the mesencephalon in a horse, **450**.
LISTERELLA INFECTION. *Listerella* encephalitis or encephalomyelitis in domestic animals, **576**; in sheep, cattle, and goats, **911**; in sheep, **162**; *Listerella* from a premature bovine foetus, **577**; *L. monocytogenes* infection in animals and man, **325**; effect of sulphanilamide and sulphapyridine on infection in mice, **957**; *Listeria*: change of name for a genus of bacteria, **325**.
LITHUANIA. See *Brucella* Infection, control; Mastitis, Bovine, control; *Mycobacterium tuberculosis* Infection, control; Paraplegia.
LIVER.
General. Hepatic lobule and liver cell of the pig during postnatal growth, **60**; phospholipid changes during the production of fatty livers in geese, **629**.
See also Iron; Vitamins, vitamin A, vitamin C.
Diseases. Pseudocirrhosis of the liver in calves, **275**; a common form of liver pigmentation in sheep (melanosis) in Norway, **534**; hepatic injury on a nutritional basis in rats, **50**; effects of carbon tetrachoride in the liver of the pig, **59**; liver necrosis following burns, simulating the lesions of yellow fever, **275**.
See also Cirrhosis; Cod Liver Oil, toxicity; *Dictyocaulus*; *Eimeria* Infection [Coccidiosis]; *Fasciola*; Hepatoma; Neoplasms, general; Pregnancy, diseases; Schweinsberg Disease.
Therapy. Raw liver therapy, **212**; effect of various fractions of liver on experimental canine blacktongue, **867**.
LIVER FLUKES. See *Dicrocoelium*; *Fasciola*.
LIVESTOCK DISEASES. See under name of country.
LIVESTOCK POPULATIONS. In Department of the Seine, France, **224**; in Nigeria, **569**; in Cyprus, **809**; in Southern Rhodesia, **893**; analysis of an animal population, **891**.
See also Reports.
LOTUS AUSTRALIS. See Poisoning, plants.
LOUPING ILL. Tissue affinities of the virus, **929**; the tick problem, **30**.
LUCILIA. See Myiasis.
"LUNGER" DISEASE. See Pneumonia.
LUNGS. See *Fasciola*; Iron; Respiratory System.
LUNGSICKNESS. See Pleuro-Pneumonia, bovine contagious.
LUNGWORMS. Small lungworms (Protostrongylidae) of sheep and wild game animals, **183**; metastrongyles of swine, **430**.
See also Adenoma; *Capillaria*; *Dictyocaulus*; *Fasciola*; *Protostrongylus*; *Synthetocaulus*.
LYMPHADENITIS, CASEOUS. See *Corynebacterium ovis* Infection.
LYMPHADENOSIS. See Lymphatic System, diseases.
LYMPHATIC SYSTEM.
General. On the formation of haemolymph nodes during the alarm reaction, **385**.
See also Infection Routes.
Diseases. Lymphadenosis of the colon in horses, **780**; lymphadenosis in a native Sangalo calf, **781**.
LYMPHOBLASTS. See Blood, corpuscles [white].
LYMPHOCYTES. See Blood, corpuscles [white].
LYMPHOCYTIC CHORIOMENINGITIS. Simultaneous occurrence of the viruses of canine distemper and lymphocytic choriomeningitis, **95**, **674**.
LYMPHOMATOSIS, 693; symposium on avian lymphomatosis and allied diseases, **452**.
See also Fowl Paralysis; Leucosis, avian.
LYMPHOSARCOMA. See Sarcoma.
LYPEROSIA. In Japan, **29**; in South Africa, **343**; a practical trap, **96**; control in Puerto Rico by beneficial insects, **343**; dosing with phenothiazine to prevent development of horn-fly larvae in manure, **96**.
LYSOZYME. See Uronic Acid; Vitamins, vitamin A.

M

M. & B. 693. See Sulphamide Compounds.
MADAGASCAR. See *Babesia* Infection [Piroplasmosis], in cattle, in horses; Reports.
MAGNESIUM. Magnesium and vitamin D relationships in calves fed mineralized milk, **456**; hyper- and hypomagnesaemia of the bovine without clinical symptoms, **612**, **695**; effects of acute magnesium deficiency on bone formation in rats, **455**.
See also Blood, chemical composition, pressure; Minerals; Pica.
MAGNETIC ELECTRON MICROSCOPE. See Microscopy.
MAL DE CADERAS. See *Trypanosoma equinum* Infection.
MALARIA. See *Plasmodium* Infection.
MALAYA. Livestock diseases in, **894**.
See also Helminth Parasites, of buffaloes; *Mycobacterium tuberculosis* Infection, in cattle, in swine; Reports; Services, veterinary.
MALIGNANT BOVINE CATARRH. See Catarrh, Bovine Malignant.
MALIGNANT OEDEMA. See *Clostridium* Infection, General.
MALLEIN. See *Pfeifferella mallei* Infection [Glanders], diagnosis.
MALTA. See *Brucella* Infection, in goats, in milk; Reports.
MALVACEAE. Egg deterioration due to ingestion by hens of malvaceous materials, **123**.
MAMMARY GLAND. Nervous and hormonal regulation of the mammary gland, **139**.
See also Carcinoma; Leucosis, general; Neoplasms, general; Pituitary Gland, lactogenic hormone; Udder.
MAN, DISEASES OF ANIMALS TRANSMISSIBLE TO AND FROM.
Bacterial Diseases. See Actinomycosis; *Bacillus anthracis* Infection; Bacteria General, haemophilic; *Brucella* Infection; *Erysipelothrix rhusiopathiae* Infection; *Mycobacterium tuberculosis* Infection; *Salmonella* Infection.
Diseases General. See Milk, diseases transmitted by; Occupational Diseases.
Fungous Diseases. See Actinomycosis; Ringworm.
Helminth Parasites. See Food Inspection, meat inspection; Helminth Parasites, of man.
Protozoan Diseases. See *Entamoeba* Infection; *Toxoplasma* Infection; *Trypanosoma* Infection.
Virus Diseases. See Viruses, of man from animals.
MANCHUKUO. See Ticks, general.
MANGANESE. Deficiency in poultry, **612**; availability of manganese in natural and precipitated manganese carbonate, **709**.
See also Perosis; Pica; Rickets.
MANGE.
General. Sheep scab in Uruguay, **29**; in the U.S.A., **898**; depluming mange of birds, **29**; histology of *Demodex folliculorum*, **179**.
Treatment. In domestic animals, **295**; with sodium hyposulphite and hydrochloric acid, **378**.
MAPHARSIDE. See *Histomonas meleagridis* Infection [Blackhead].
MARSH'S DISEASE. Appearing after use of encephalomyelitis antiserum, **24**.
MASTITIS, BOVINE.
General, 1; characteristics of udder staphylococci, **231**; a filtrable virus isolated from mastitis cows, **516**; relation of streptococcal mastitis to certain phases of milk sanitation, **788**; potential barriers in transmission, **71**; cultural and clinical significance of non-haemolytic streptococci that ferment aesculin, **2**; a method of preparing udders for study, **62**; staining of unpreserved udder tissue affected with mastitis, **62**.
See also Milk, general; *Pasteurella* Infection, in cattle; *Streptococcus*, general; *Streptococcus agalactiae*.
Control, 487; in Switzerland, **70**; in Lithuania in 1937, **603**; in Illinois, U.S.A., **325**.
Diagnosis. Clinical, **573**; clinical, field, and laboratory diagnosis, **440**; indirect diagnosis, **229**; by cultural methods, **1**, **229**, **573**; the casein number for diagnosis, **229**; methylene blue reduction test, **229**; value of the Hotis test, **229**.
See also Milk, bacteria, content.
Treatment, 207; infusion therapy, **957**; infusion with entozon B, **56**; with trypaflavine, **207**; chemotherapy with sulphamide compounds, **207**, **293**, **702**, **703**; in the U.S.A., **898**; immunotherapy with "mastitex", **407**, **488**.
MASTITIS, OVINE. See *Staphylococcus* Infection, immunization.

MAURITIUS. Livestock diseases in, **402**.
See also Reports.
MEAT. See Food Inspection, meat inspection ; Food Preservation.
MEAT POISONING. See Food Poisoning.
MEDIA. Bacteriological culture medium technique, **68** ; spinach culture medium, **969** ; culture flask for circulation of large quantity of fluid, **630** ; apparatus for surface culture of anaerobes and tubercle bacilli, **63**.
See also Embryos, fowl ; Technique, bacteriological, histological, and under name of specific organism and disease.
MEDICINE, VETERINARY. Practice of, **645**.
See also Books ; Statistics.
MEINICKE'S REACTION. See *Brucella* Infection, diagnosis [serological].
MELANOSIS. See Liver, diseases.
MENINGIOMA. Debatable tumours in human and animal pathology. VI. Meningioma, **44**.
MERCUROCHROME. See Pox, in birds.
MESOCESTOIDES. Life-history of *M. lineatus* in dogs and cats in India, **682**.
METABOLISM. GENERAL.
General. Biological oxidations and reductions, **147** ; tissue respiration, **383** ; physiological basis for animal nutrition, **367** ; vital energetics : a study in comparative basal metabolism, **156** ; study of intermediary metabolism of animals with the aid of isotopes, **799** ; fasting metabolism of ruminants, **137**.
See also Adrenal Gland ; Blood ; Bones ; Nitrogen ; Pituitary Gland ; Urine ; Vitamins.
Mineral. See Calcium ; Magnesium ; Manganese ; Minerals ; Phosphorus ; Trace Elements.
Diseases. Puerperal metabolic diseases in sows, **367**.
See also Grass Tetany ; Ketosis ; Milk Fever ; Pica ; Toxaemia ; Vitamins.
METASTRONGYLES. See Lungworms.
METHYLENE BLUE REDUCTION TEST. See Mastitis, Bovine, diagnosis; Milk, bacterial content, methylene blue reduction test.
MICE. See Adenoma ; Neoplasms, general ; *Pasteurella* Infection ; Rolling Disease ; Sarcoma.
MICROFILARIAE. Of dogs in Uruguay, **686** ; microfilarial pityriasis in equines (lichen tropicus), **525** ; "khoojlee" or lichen tropicus of horses in India, **935**.
See also *Parafilaria*.
MICROSCOPY. Text-books, **648**, **901** ; limits of resolution and visibility, **564** ; fluorescence microscopy, **717** ; in tropical medicine, **716** ; in bacteriology, **447** ; magnetic electron microscope in biology, **474**, **716**.
See also *Mycobacterium tuberculosis* Infection, diagnosis ; Viruses, size of particles.
MICROSPORON. See Ringworm.
MIDGES. See *Dantosimulium* ; *Simulium*.
MILK.
General. Production of milk of abnormal composition by cows free from udder streptococci, **230** ; milk secretion, **226** ; milk and milk products in the colonial empire, **64**.
Bacterial Content. Of goat's milk, **459** ; microscopic test for quality milk, **616** ; the udder as a source of coliform organisms in milk, **290** ; presumptive coliform test, **52** ; methylene blue and azurulin reductase tests, **52** ; direct microscopic (Breed) count, **52** ; detrimental effect of putrefactive bacteria on milk in Egypt, **547** ; changes in the bacterial content of milk during heat treatment according to the German milk order, **204** ; preliminary alcohol treatment of milk samples as an aid to the g. pig test for tubercle bacilli and *Br. abortus*, **548**, **549**.
See also *Brucella* Infection, in milk ; Mastitis, Bovine, diagnosis ; *Mycobacterium tuberculosis* Infection, in milk ; *Salmonella* Infection, in milk.
Cell Content. Direct microscopic (Breed) count of leucocytes, **52** ; examination of raw and heated milk for "microscopically demonstrable pus", **52**, **374** ; changes in the cell content of milk during heat treatment according to the German milk order, **204** ; diagnostic significance of fluctuation of leucocyte content during a milking season, **214**.
Chemical Composition. Of goat's milk as compared with cow's milk, **140** ; effect of subcutaneous implantations of adrenalin tablets on milk composition of lactating ruminants, **464**.
Control. France : decree of 28th April, 1939, relating to the sale of raw milk for human consumption, **870** ; France : decree of 26th April, 1939, relating to the control of pasteurization plants, **870** ; France : the law concerning the sale of milk from cows with foot and mouth disease, **508** ; official veterinary milk control in Germany, **616** ; report of Helsingfors milk control station for 1936, **67**.
Diseases Transmitted By. Milk-borne epidemics in New York, U.S.A., **617** ; report of the committee on communicable diseases affecting man (milk-borne epidemics in U.S.A. and Canada), **701** ; an outbreak of Sonne dysentery in Great Britain, **291** ; biennial reviews of the progress of dairy science : milk-borne disease, **123**.
See also *Brucella* Infection, in milk ; *Mycobacterium tuberculosis* Infection, in milk ; *Salmonella* Infection, in milk.
Hygiene. In the U.S.A. **547** ; report of special committee on food hygiene [American Veterinary Medical Association], **123** ; value of milk in Great Britain from a hygienic point of view, **547**.
See also Apparatus ; *Brucella* Group, viability ; *Brucella* Infection, in milk ; Food Inspection, general ; Mastitis, Bovine ; Milk, bacterial content, control.
Methylene Blue Reduction. Lengthening of the reduction time in milk with the new standard methylene blue solution, **549** ; factors influencing the reduction of methylene blue in milk, **204**.
See also Milk, bacterial content.
Nutritive Value. Of pasteurized milk for calves, **283** ; skim milk powder for calves, **114**.
See also Vitamins, vitamin D.
Pasteurization. The phosphatase test for control of efficiency o pasteurization, **283**, **869** ; application of the photelometer to **549** ; the coliform test in, **549**.
See also Milk, control.
MILK FEVER. In the Kentucky station herd, U.S.A., **783** ; nature and treatment with insulin, **277**.
MILK-BORNE DISEASES. See Milk, diseases transmitted by.
MILKER'S NODULES. Vaccinia virus as the cause of, **256**.
MILKING MACHINES. See Apparatus.
MINERALS.
General. Requirements of animals, **197**, **284** ; the electron microscope for the localization of minerals in biological tissues, **716**.
See also Calcium ; Magnesium ; Manganese ; Phosphorus.
Deficiency. In Cattle in British Guiana, **541** ; suspected amongst cattle in Uganda, **118** ; soil deficiencies in New Zealand, **114** ; inorganic compounds in healthy and sick animals, **284**.
See also Abortion ; Cobalt ; Copper ; Helminth Parasites, nutrition in relation to ; Iron ; Phosphorus.
Metabolism. Calcium-phosphorus metabolism of Swiss brown cattle, **542**, **863** ; significance of mineral metabolism in therapeutics and for productivity, **367**.
See also Blood, chemical composition ; Bones, diseases ; Magnesium ; Phosphorus, deficiency ; Trace Elements.
Therapy. Diffusion of calcium, magnesium and phosphorus into the peritoneum ; effect of intravenously injected calcium salts and of parathyroid hormone, **215**.
See also Perosis.
MINK. Diseases of, **945**.
See also *Bacillus anthracis* infection ; Calcium.
MITES. Air sac mites (*Cytodites nudus*) in hens, **180**.
See also Arthropod Parasites, general ; Mange ; *Moniezia*.
MOLASSES. See Poisoning, general.
MONIEZIA. Epizootology of *Moniezia* in sheep, **522** ; effect on sheep, **593** ; studies on *M. expansa* in sheep, **182** ; life cycle of *M. expansa*, **182**, **263**, **522** ; *M. benedeni* in buffaloes, **429**.
MONKEYS. See *Mycobacterium tuberculosis* Infection ; Papilloma ; *Trypanosoma* Infection, transmission.
MONOCYTOMA. See Neoplasms, general.
MOOSE. See Encephalitis, general.
MORANYL (FOURNEAU 309). See Germanin (Bayer 205).
MOROCCO. Livestock diseases in, **476**, **727**.
See also *Bacillus anthracis* Infection, general ; Ecthyma, contagious ; Rabies, immunization ; Reports ; Services, veterinary ; Silicosis.
MOSQUITOES. Role in transmission of animal diseases, **429**.
See also *Dirofilaria* ; Horse-Sickness, African.
MOULDY FODDER. Mouldy hay as a cause of broken wind in horses and abortion in cows and mares, **532**.
MUCIN. See *Mycobacterium tuberculosis*, virulence ; Phagocytosis.
MULES. See Arthritis ; *Babesia* Infection [Piroplasmosis] ; Selenium ; *Trypanosoma hippicum* Infection [Murrina].
MUSCLES.
General. Muscle haemoglobin, **467** ; muscle protein and its properties, **626**.
Diseases. Myoglobinuria of horses, **946** ; congenital myotonia in goats, **42**, **276** ; experimental muscular dystrophy in the g. pig, **47** ; nutritional muscular dystrophy in young rats, **700**, **786** ; cure and prevention with synthetic α-tocopherol acetate, **787** ; reduced muscle creatine in paralysed young E-low rats, **202**.
See also Foot and Mouth Disease, pathology ; Vitamins, vitamin E.
MUSTARD GAS. See Gases, poisonous.
MYCOBACTERIUM, GENERAL. Susceptibility of the golden hamster (*Cricetus auratus*) and the field vole to the vole strain of acid-fast bacillus, **234** ; action of serum, cells and blood on acid-fast bacteria *in vitro*, **771** ; precipitins for the tuberculin proteins of acid-fast bacteria, **687** ; simplified method of staining, **472**.
See also *Mycobact. tuberculosis* Infection, diagnosis, immunization, skin lesion reactors.

MYCOBACT. JOHNEI INFECTION [JOHNE'S DISEASE], 237; in Mysore State, India, 410, in Holland, 479; in the U.S.A., 899; in sheep, 323; infection of laboratory animals with aid of paraffin oil, 323; research on johnin, 980.

MYCOBACT. TUBERCULOSIS.

[*Readers should examine all sub-headings of this and the following main headings when seeking information on tuberculosis.*

For acid-fast bacteria other than the tubercle bacilli and the bacillus of Johne's disease, see under Mycobacterium, *General.*]

General. Separation of lipoid, polysaccharide and protein antibodies of tuberculous serum by the specific inhibition reaction, 853; antigenic structure of the tubercle bacillus, 434; antigenic properties of bovine type bacilli, 236; quantitative studies of the reaction of complement fixation with tuberculous immune serum and antigen, 434.

Avian Type. Serology of, 908; presence in apparently pure cultures of diphtheroids, 410.

BCG. General tissue and humoral response to, 154; dispersion in the body of the g. pig, 235; attenuation, 908; pathogenicity, 493; metabolism, 493.

Bovine Type. Distinctive characteristics, and role in human TB., 235.

Chemical Composition. Chemistry of the lipids of tubercle bacilli. LVII. Mycolic acids of the avian tubercle bacillus wax, 75; ←. LX. Lipids of the avian tubercle bacillus, 822; polysaccharides of a bovine strain, 9; effects of tuberculoprotein, 937.

Cultivation. Value of various media for primary culture from tuberculous material, 737; culture media, 73, 301; a medium for culture, isolation and dissociation, 216; influence of glycerin and allied chemical compounds on human and bovine types, 822; effect of blood serum on growth in the depths of liquid media, 653; influence of *l*-ascorbic acid on development, 74; relationship between moist weight and total and viable organisms in cultures, 9; early demonstration by examination of smears from cultures, 653; apparatus for surface culture, 63.

Dissociation. Connexion between development of daughter colonies of human and bovine types and development of new variants, 74; change from S to R forms of avian type bacilli in a goat, 651.

In Oil. Metastatic lesions caused by dead tubercle bacilli embedded in paraffin, 321; preparation and properties of aqueous suspensions of oil-coated tubercle bacilli, 883.

Purified Protein Derivative. See below.

Tuberculin. Purification, 687; comparison of old tuberculin and purified protein derivative, 184; isolation of P.P.D. from O.T. and fractionation of the residue, 687; proposal for a standard method of tuberculin preparation, 526; tuberculin anergy and the variability of tuberculin, 432; methods of preservation, 770.

Vaccine. Proposal for a standard method for preparation of anti-TB. vaccine, 526; vaccine prepared by irradiating the tubercle bacillus with radon, 909.

Viability. Disinfection trials of tubercle bacilli with "tebecit" (sodium *o*-phenyl phenolate), 821; phenyl mercuric acetate as a disinfectant, 907; tubercle bacilli in waste water from abattoirs and dairies, 788.

Virulence, 737; of primary infection in Koch's phenomenon, 161; for white mice of the three types of bacilli, 907; pathogenicity for g. pigs of bacilli suspended in gastric mucin, 410; exaltation of the virulence of avian type bacilli by subsequent infection with virulent tubercle bacilli or killed *Bacterium coli*, 320.

MYCOBACT. TUBERCULOSIS INFECTION.

General. Susceptibility of the golden hamster (*Cricetus auratus*) and the field vole to bovine, human and avian tubercle bacilli, 234; TB. of the g. pig, 226; occurrence of virulent tubercle bacilli in presumably non-tuberculous lung tissue, 492; TB. from talcum used to dry rubber gloves after necropsies, 236.

Allergy. In experimental TB., 909; allergy and immunity (iathergy) in experimental TB., 599; allergy without infection, 653; prolongation by injection of killed tubercle bacilli suspended in lanolin or vaseline, 35.

Avian Type Infection. In cattle, 159; in cattle and swine in Portugal, 819; in the udder of a goat, 651.

Bovine Type Infection. In man in the tropics, with special reference to Uganda, 649.

In Calves. Genesis of, 905; cause of the increase in Germany, 6.

In Cats, 7, 319.

In Cattle, 159; in South Africa, 941; in Yugoslavia, 772; in Bulgaria, 186; in Brazil, 7; in the Argentine, 234; in Singapore and Bali, 907; in Burma, 320; in Portugal [avian type], 819; rarity in Tanganyika, 907; is bovine TB. increasing?, 236; vulvar TB., 904; pulmonary TB.; location and type of lesions, 734; TB. in man as a source of infection for cattle, 820.

Control. Of bovine TB. in Wales, 491; in New South Wales, Australia, 637; in the U.S.A., 899; in Holland, 161, 318; in Lithuania, 161, 603; in Hungary, 105; in Belgium, 490; in Portugal, 160, 233; report of the special committee on [avian and bovine] TB. [American Veterinary Medical Association], 72; role of tuberculin testing in eradication, 268, 269; importance of human type bacilli, 650.

See also Law, France, Portugal.

Diagnosis, 408; of bovine TB. in India, 575; cultural and biological methods, 7, 321; use of fluorescence microscope, 717; direct microscopic diagnosis compared with pathological findings, 734; serological identification of bovine type in man, 74; quantitative studies of complement fixation with tuberculous immune serum and antigen, 434; concentration of tubercle bacilli from spinal fluid by chemical flocculation and lipoid solvents, 883; demonstration of tubercle bacilli in urine by phosphate flocculation, 884; evaluation of the concentration methods of Petroff, Pottenger, and chemical flocculation, 74; amounts of tubercle bacilli in tuberculous products, 821; acid-fast bacilli as a source of error, 75.

In Dogs, 7, 319, 408; bacillaemia in experimental TB., 73, 735.

In Eggs. Presence of tubercle bacilli in hens' eggs, 575.

In Fowls. Avian TB. in Portugal, 7; in the U.S.A., 899; in Hungary, 12, 651; cause of condemnation by meat inspectors of fowls of the "old hen" class, 460.

In Goats. In Uganda, 408; avian type infection of the udder, 651.

In Horses. Types of tubercule bacilli in equine TB., 490.

Human Type Infection. Importance in bovine TB. control, 650.

Immunity. Inherited natural resistance, 438; allergy and immunity (iathergy) in experimental TB., 599; relation of lymphocytes to the activity of *Mycobact. tuberculosis*, 821; vitamin C and immunity in g. pigs, 321.

Immunization [General]. Immunizing property of heat-killed tubercle bacilli, 737; behaviour of rabbits inoculated many times with dead avian tubercle bacilli, tested by live avian bacilli, 735; effect of vaccination of g. pigs with the vole acid-fast bacillus on subsequent tuberculous infection, 737.

Immunization [BCG]. Immunity conferred in calves by BCG, 736; by BCG in an oily excipient, 322; by BCG and heat-killed organisms in the g. pig, 736; limits of human premunition by means of BCG, 652; vaccination of g. pigs with living BCG, 322; general tissue and humoral response to an avirulent tubercle bacillus, 154.

In Man. Due to bovine type bacilli in the Netherlands, 8, 906; in Norway, 237; in Finland, 9; human and bovine type bacilli in human TB. in Scotland, 651; report on anti-TB. service in Wales and Monmouthshire, 491; primitive TB., 227; bovine type in children, 576; occupational TB. in meat inspectors, 491; dogs and cats as sources of infection, 319.

Meat Inspection. Regulations in France, Scotland, Germany and Holland, 291; decision on tuberculous slaughter animals, 372; tubercle bacilli in meat stripped of tuberculous serous membranes, 702; is it sufficient in cases of pleural TB. to remove the pleura alone?, 701; importance of head and shoulder lymph nodes in swine, 205; legally contagious forms of bovine TB. in France, 650; tubercle bacilli in waste water from abattoirs, 788.

In Milk. Methods of isolating tubercle bacilli from milk, 52, 290; milk in Ankara, Turkey, from the point of view of TB., 616; tubercle bacilli in milk and milk products in Paris, 123; tubercle bacilli in waste water from dairies, 788.

See also Milk, bacterial content.

In Monkeys. Spontaneously acquired TB. in rhesus monkeys, 321.

Pathogenesis. Pathology and pathogenesis of TB. in domesticated animals compared with man, 821; lesions produced in mice by the three types of tubercle bacilli, 73; tuberculous superinfection in rabbits, 322; course of experimental TB. in g. pigs, 8; vitamin C in pathogenesis of TB. in the g. pig, 652; influence of Duran-Reynals factor on pathogenesis of avian type infection, 651; influence of size and virulence of infecting dose on the course of TB., 492; acute or chronic lesions produced by colonial variants of tubercle bacilli, 409; effect of preventing hypersensitivity, 653; exaltation of the pathogenic power of avian type bacilli by subsequent infection with virulent tubercle bacilli or killed *Bacterium coli*, 320.

In Sheep. In Uganda, 408; case due to the bovine type, 72.

Skin Lesion Reactors, 531, 690; nodular caseation and TB. of the skin in cattle, 904.

In Swine. In Bulgaria, 650; in Singapore and Bali, 907; in Portugal [avian type], 819; types of tubercle bacilli in, 72; TB. in garbage-fed swine, 491; cause of the increase in Germany, 6.

Treatment. With sulphonamide, 375; with sulphaniilamide, 552, 705, 873; with sulfapyridine, 702; inhibitory action of sulphamide and of a sulphone on avian tubercle bacilli, 909; action of *p*-aminophenylsulphamide and of *p*-diamino-diphenylsulphone, 375; crotonaldehyde in experimental TB., 702.

Tuberculin Test, 159, 936; in Belgrade in 1938, 233; regulations for tuberculin testing in Uruguay, 35; in cattle, 159; differentiation by tuberculin testing of human, bovine and avian types of

MYCOBACT. TUBERCULOSIS INFECTION [cont'd].
Tuberculin Test [cont'd].
infection in cattle, **160**; methods for the evaluation of, **102**; dosage for the subcutaneous test in cattle, **526**; the double intradermal test, **101**; use of P.P.D. in the double intradermal test, **267**; use of synthetic medium tuberculin, **267**; relation between skin measurement and character of swelling in double intradermal tests, **769**; reliability of the avian test, **35**; in avian type infection, **101**; in cattle infected with avian type bacilli, **936**; in swine infected with avian type bacilli, **937**; intradermal test applied to pigs, **35**; possibility of sensitization to tuberculin, **354**; the avian tubercle bacillus in sensitization of cattle to tuberculin, **354**; influence of inoculation method and virulence of bacilli on skin sensitivity in the g. pig, **355**; do tuberculin tests activate tuberculous processes?, **686**; histological changes of wattles of tuberculous hens after intradermal tuberculin injections, **355**; leucocytic blood picture of tested cattle, **432**.
In Wild Animals and Birds. Spontaneous TB. in wild mammals in captivity, **906**; in the Cape kudu, **905**; in a roe deer, **905**; in the emu, **234**.
MYCOSIS. See Ringworm.
MYCOTORULA ALBICANS. Cause of blackhead in turkeys, **583**.
MYIASIS.
General. Of the mouth in young calves, **178**; prophylaxis for wound myiasis in domestic animals, **621**; the enzyme urease and the occurrence of ammonia in maggot-infested wounds, **28**; key for blowfly larvae concerned in wound and cutaneous myiasis, **764**; locations for blowfly traps; abundance and activity of blowflies in Texas, **28**; the screwworm in the U.S.A., **97**; natural foods of *Cochliomyia americana*, **97**; effects of acidity, alkalinity, and moisture content of the soil on emergence of, **343**; development of immunity in cavies to the larvae of, **97**; volatile oils as ovicides for, **463**.
In Sheep, 178; economy jetting, **719**; pH of myiotic wounds in sheep and goats, **28**; development of *Lucilia sericata*, **97**, **342**; biology of *L. sericata* in Baluchistan, **764**; temperature preference in the Australian sheep blowfly, *L. cuprina*, **842**.
See also Dips.
MYOCARDITIS. See Foot and Mouth Disease, pathology.
MYOGLOBINURIA. See Muscles, diseases.
MYOTONIA. See Muscles, diseases.
MYXOMA. Investigations on rabbit myxomatosis, **362**; serological relationship of myxoma and Shope's fibroma viruses, **538**; immunity relations between the Shope fibroma virus, the myxomatosis virus and the neurolapin (pox) virus in rabbits, **27**.

N

NAGANOL. Chlorine retention after injections of, **377**.
See also Germanin (Bayer 205); *Trypanosoma* Infection, treatment; *Trypanosoma evansi* Infection [Surra], treatment.
NAIROBI SHEEP DISEASE. In Kenya, **942**.
β-NAPHTHYLAMINE. See Neoplasms, causation.
NAVICULAR DISEASE, 604.
NECROTIC ENTERITIS. See Enteritis, necrotic.
NEMATODES, GENERAL. Verminous gastro-enteritis of goats and sheep in Pernambuco State, Brazil, **266**; nematodes from buffaloes in slaughter houses in Canton, including two new species **429**; parasitic nematodes of captive wild animals, **593**; respiration of nematodes of the alimentary tract, **99**; physiology of sheep nematodes, **265**; immunity in intestinal nematode infections, **273**; technique for counting eggs in sheep faeces, **217**; collection of larvae from faeces, **594**; efficacy of phenothiazine for removal of nematodes from sheep, **555**; destruction of larvae in faeces by predatory fungi, **594**, **848**.
See also *Ancylostoma*; *Ascaridia*; *Capillaria*; *Dictyocaulus*; *Dirofilaria*; Filariae; *Habronema*; Helminth Parasites, general; *Heterakis*; *Hyostrongylus*; Lungworms; Microfilariae; *Nematodirus*; *Oesophagostomum*; *Onchocerca*; *Ornithostrongylus*; *Oxyspirura*; *Parafilaria*; *Protostrongylus*; *Spirocerca*; Stomach Worms; Strongyles; *Strongyloides*; *Strongylus*; *Subulura*; *Syngamus*; *Synthetocaulus*; *Toxocara*; *Trichinella*; *Trichonema*; Trichostrongyles; *Trichostrongylus*; *Trichuris*; *Uncinaria*.
NEMATODIRUS. Occurrence and pathogenicity in arid areas, **100**; method of obtaining eggs and larvae, **850**.
NEMBUTAL. Use in treatment of dogs poisoned by the giant toad, *Bufo marinus*, **297**.
NEOPLASMS, GENERAL.
General. Recent research, **536**; incidence of tumours in domestic animals, **949**; rarity of cancer in the cow's udder, **949**; cancer in the dog, **537**; testicular tumours in dogs, **859**; squamous-celled carcinoma of the tonsil in the dog, **192**; cutaneous schwannoma of Pacinian type in a dog, **860**; mammary cancer in a cat, **280**; resemblance of pulmonary adenomatosis (jaagsiekte) in sheep and cancer of the lung in man, **362**; comparative pathology of thymic tumours, **363**; initiation and growth of tumours, **608**; development of malignancy in animals and changes in the REStropic activity of blood, **194**; the glutamic acid of malignant tumour tissue, **860**; a complement-fixing antigen common to filtrable and non-filtrable tumours of fowls, **609**; factors influencing the infectivity of fowl tumours, **609**; histiocytic tumour (fibrohistiocytoma) in the rat, **281**; growth characters of spontaneous tumours of the mouse, **282**; a transmissible monocytoma of the mouse, **193**; a transferable liver neoplasm (C 198) arising in a mouse, **539**; transmission of the Rous filtrable agent to chemically induced tumours, **96**; distribution of metastases in the Brown-Pearce tumour, **537**; role played by trauma in dissemination of fragments of Brown-Pearce rabbit epithelioma, **363**; resorption of Brown-Pearce rabbit carcinoma to immunized animals, **449**; resistance to experimental cancer, **45**; X-ray resistance of the causal agents of fowl leucosis, fowl sarcoma, and other transmissible tumours, **783**; effect of freezing *in vitro* on transplantable mammalian tumours and on normal rat skin, **282**.
See also Adenoma; Biological Products, preservation; Carcinoma; Carcinosarcoma; Fibroma; Hepatoma; Leucosis; Lipoma; Myxoma; Neuroma; Reports, Great Britain [research]; Sarcoma; Seminoma; Viruses, fowl viruses; Wheat-Germ Oil.
Causation. New aspect of cancer research [virus causation], **447**; chemical agents and viruses in cancer, **446**; tumour-producing viruses in fowls, **341**; attempts to propagate fowl tumours produced by benzpyrene and by virus, **191**; chemo-antigens and carcinogenesis, **282**; influence of carcinogenic compounds on growth of spontaneous mouse tumours, **282**; effect of carbohydrate on granulocyte accumulation in various mouse tumours, **193**; aetiology of aniline tumours, **451**; bladder tumours in dogs following administration of β-naphthylamine, **451**; reaction of mouse skin to reduced and partially oxidized sulphur compounds, **875**; effect of diet on tumours induced by ultra-violet light, **281**; relation of the vitamin B complex to tumour growth, **200**; biological connexion between virus, bacteriophage, genes and cancer production, **304**; cancer and prognosis, **449**.
See also Neoplasms, endocrine system in relation to.
Classification. Suggestions for revision of tumour nomenclature, **608**; morphological variations of tumour cells, **45**; debatable tumours in human and animal pathology. VI. Meningioma. VII. Granulosa-cell tumour of the ovary, **44**; a "mixed" mammary tumour in a dog and its histogenesis, **280**; incidence and classification of avian tumours, **608**.
Endocrine System in Relation To. Effect of thymus transplants on tumour growth, **114**; hypothetical correlation of a secretion of Hassall's corpuscles and cancer, **610**; relation between tumour growth and hormone level, **363**; effects of extracts of human urine on tumours in mice, **113**; tumours following administration of sex hormones, **113**, **194**; pregnancy and the growth of carcinoma, **281**.
Heredity. The genetic nature of susceptibility to cancer, **449**; hereditary bone tumours in mice, **536**.
Treatment. Of benign tumours of horses, dogs, and cattle with trichloracetic acid injections, **963**; tissue specificity and the chemotherapy of cancer, **621**.
NEPHRITIS. Experimental nephritis produced by staphylococcus toxin in the dog, **71**; production of nephritis in rats by parathyroid hormone and vitamin D, **859**.
NERVOUS SYSTEM.
Genera.. See Bones, general; Mammary Gland.
Autonomic. See Digestive System, diseases; Neuroma.
Diseases. Nervous affections in man and animals, **857**; demyelination of the fibres of the spinal cords in swine, **195**; experimental neurosis in dogs of known genetic constitution, **111**.
See also Aujeszky's Disease; Brain, diseases; Calcium, deficiency; Chastek's Paralysis; Encephalitis; Encephalomyelitis; Fowl Paralysis; *Listerella* Infection; Lymphocytic Choriomeningitis; Neuroma; Rabies; Technique, histological; Vitamins, vitamin A, vitamin B complex, vitamin B_1, vitamin B_2, vitamin E.
NEUROLYMPHOMATOSIS. See Fowl Paralysis.
NEUROMA. A sympathetic ganglioneuroma in a horse, **610**.
NEUROMALACIA. See Vitamins, vitamin B_2.
NEWCASTLE DISEASE. In Great Britain, **762**; in the Dutch East Indies, **256**; diagnosis and control, **177**.
NEW ZEALAND. See Cobalt, general; *Echinococcus*; Eczema; Iodine; Minerals, deficiency; Poisoning, metals metalloids and salts; Reports; Research, general.
NICOTINE. See Poisoning, general.
NICOTINIC ACID. See Vitamins, vitamin B complex.

NIGERIA. Livestock diseases in, **568**.
See also Breeding ; *Glossina* ; Reports.
NIGHT BLINDNESS. See Vitamins, vitamin A.
NITRATE. See Poisoning, plants.
NITROGEN. Nitrogen metabolism, **982**.
See also Anaesthetics.
NITROUS OXIDE. See Anaesthetics.
NOMENCLATURE. See Bacteria General, classification ; *Listerella* ; Neoplasms, classification ; Parasitic Infestation, general.
NORTHERN IRELAND. See Aujeszky's Disease, general ; *Brucella* Infection, immunization ; *Clostridium* Infection, General, in sheep.
NORTHERN RHODESIA. Livestock diseases in, **150**, **642**.
See also Reports.
NORWAY. See *Brucella* Infection, control ; Food Inspection, general ; Liver, diseases ; *Mycobacterium tuberculosis* Infection, in man ; Tick-Borne Fever.
NOVARSENOL. See Pleuro-Pneumonia, treatment.
NUTRITION.
General. Animal nutrition in South Africa, **194** ; physiological basis for animal nutrition, **367** ; nutritional physiology of the adult ruminant, **729**, **881** ; nutritional studies in swine, **195**, **367**, **862** ; in dogs, **114** ; sprouted fodder and germinated grain in stock feeding, **455** ; skim milk powder for calves and a comparison of various supplemental feeds, **114**.
See also Bacteria General, flora of organs and tissues ; Blood, picture ; Boron ; Cod Liver Oil ; Milk, nutritive value ; Minerals, general, metabolism ; Phosphorus ; Vitamins.
Diseases in relation to. Influence of diet on disease, **46** ; nutritional deficiencies in South Africa, **194**.
See also Acidosis ; Anaemia ; Anaemia, Equine Infectious ; Cannibalism ; Coast Disease ; Congenital Defects ; Copper, deficiency ; Diarrhoea ; Foot and Mouth Disease, virulence ; Haemoglobinaemia ; Haemoglobinuria ; Hysteria, canine ; Ketosis ; Liver, diseases ; Minerals, deficiency ; Muscles, diseases ; Neoplasms, causation ; Parathyroid Glands ; Perosis ; Pica ; Pine Disease ; Rickets ; Trace Elements ; Vitamins.
NUTTALLIA. See *Babesia*.
NYASALAND PROTECTORATE. Livestock diseases in, **478**.
See also Arthropod Parasites ; *Glossina* ; Reports.
NYCTALOPIA. See Vitamins, vitamin A.
NYMPHOMANIA. Ovaries of nymphomaniac mares, **108**, **277**.

O

OAT HAY POISONING. See Poisoning, plants.
OCCUPATIONAL DISEASES. Of veterinarians, **530** ; dust-borne, **857**.
OEDEMA. See Digestive System, diseases ; Vitamins, vitamin A.
OEDEMA, MALIGNANT. See *Clostridium* Infection, General.
OESOPHAGOSTOMUM. Treatment in sheep with phenothiazine, **877**.
OESOPHAGUS. Anatomy in cattle, **559**.
See also Carcinoma.
OESTRIDAE.
Bots. *Gastrophilus* in Rumania, **765** ; summer dermatitis of the cheek in horses caused by *G. inermis*, **843** ; precipitation experiments with polysaccharide antigens in *Gastrophilus* infestation, **932**.
Warbles. Control of ox warble-flies in Germany, **257** ; *Hypoderma lineatum* in Denmark, **590** ; in India, **178**, **590** ; changes in the skin of cattle infected with the larvae, **257** ; relation of soil moisture to mortality of the pupae, **29** ; morphology of the larvae of *H. crossii* from goats in India, **590**.
Treatment. Salt as an ox-warble larvicide, **960** ; control by the hook and derris-wash methods, **960**.
OESTRIN, OESTROGEN, and **OESTRONE.** See Hormones, sex hormones.
OESTRUS. Periodicity in sheep, **141** ; induction in the ewe, **215**.
See also Sterility, in horses.
OLEANDER. See Poisoning, plants.
ONCHOCERCA. *O. gibsoni* in African cattle, **351** ; *O. bovis* in French cattle, **598** ; *O. cervicalis* in the ligamentum nuchae of horses in India, **935**.
See also Microfilariae.
ORANGE FREE STATE. See Paralysis, tick.
ORNITHODOROS. See Ticks.
ORNITHOSTRONGYLUS. *O. quadriradiatus* in Indian domestic pigeons, **935**.
OSTEOCHONDROMATOSIS. Pathogenesis of multiple hereditary osteochondromatosis, **860**.
OSTEODYSTROPHIA, OSTEOMALACIA, and **OSTEOPOROSIS.** See Bones, diseases.
OSTRICHES. See Blood, general.
OTOCENTOR. See Ticks.
OVA. Living tubal ova in the goat, **392**.
OVARY. Physiology of the corpus luteum, **715** ; development and regression of the corpus luteum and ovarian follicle in pregnant mares, **629**.
See also Genital System, diseases ; Hormones, sex hormones ; Nymphomania.
OXYGEN. See Blood, respiratory quotient ; Metabolism, general ; Respiration.
OXYSPIRURA. Control of Manson's eyeworm of poultry in Antigua, B.W.I., **35**.

P

PALESTINE. Livestock diseases in, **810**.
See also Rabies, general ; Reports.
PANAMA CANAL ZONE. Tropical and subtropical diseases in, **942**.
See also Arthritis ; Encephalomyelitis, Equine, general ; *Trypanosoma cruzi* Infection [Chagas' Disease] ; *T. hippicum* Infection [Murrina].
PANLEUCOPENIA. Of cats, **606** ; immunization, **841**.
PAPILLOMA. Contagious papilloma of the mouth of dogs, **279** ; transmission of human papilloma to monkeys, **861**.
PARAFILARIA. Aetiology of cutaneous haemorrhage ["blood sweating"] in Hungarian horses, **934**.
PARAGONIMUS. Treatment of paragonimiasis in dogs, **556**.
PARALYSIS, CHASTEK'S. See Vitamins, vitamin B_1.
PARALYSIS, TICK. In lambs caused apparently by *Rhipicephalus evertsi*, **429**.
PARAMPHISTOMES. Intestinal paramphistomiasis of sheep in Sind (India), **934**.
PARAMPHISTOMUM. Infestation of *Bulinus truncatus* with *P. cervi* in Tunisia, **261**.
PARAPLEGIA. Of lambs in Lithuania, **534** ; equine infectious paraplegia, **604**.
PARASITIC INFESTATION, GENERAL. Work on parasitology in the U.S.A., **899** ; at Henry Lester Institute of Medical Research, Shanghai, 1937-38, **678** ; parasitology of domestic animals, **342** ; of domestic and wild animals, **106** ; nomenclature of animal parasites, **678** ; principles of parasite control, **729** ; diseases of elephants at Minbyin, Upper Burma, **602** ; parasitic diseases of horses, **485** ; parasites of dogs in Oporto, Portugal, **346** ; in Zagreb, Yugoslavia, **345**.
See also Arthropod Parasites ; Diseases General ; Helminth Parasites ; Protozoa ; Reports.
PARASITICIDES. See Anthelmintics ; Dips ; Insecticides ; Repellents.
PARATHYROID GLAND. Hyperparathyroidism produced by diet, **119** ; effect of parathyroid hormone on diffusion of calcium, magnesium and phosphorus into the peritoneum, **215**.
See also Hormones, sex hormones ; Nephritis.
PARROTS. See Psittacosis.
PARTURITION. See Haemoglobinaemia ; Haemoglobinuria ; Metabolism, diseases ; Pregnancy.
PASTEURELLA GROUP. Differentiation of *Past. pestis* from *Past. pseudotuberculosis rodentium*, **394** ; variability of *Past. pestis* under the influence of bacteriophage, **411** ; transmutation of *Past. pestis* into *Past. pseudotuberculosis*, **411**.
PASTEURELLA INFECTION.
General. In white mice, **411**.
In Buffaloes. In Annam, **77** ; in Indian buffaloes in the Philippines, **77**.
See also *Pasteurella* Infection, immunization.
In Cats. Haemorrhagic septicaemia in cats, **162** ; production of head sinus inflammation in cats with a *Pasteurella* resembling the influenza bacillus, **579**.
In Cattle [Haemorrhagic Septicaemia], **239**, **604** ; in Annam, **77** ; differences in clinical picture of transit fever and haemorrhagic septicaemia, **604** ; isolation of *Past. septica* from the udder secretion of a cow with mastitis, **77**.
See also *Pasteurella* Infection, immunization.
In Fowls [Fowl Cholera]. Carriers of infection, **162** ; detection of carriers by a stained-antigen, rapid whole-blood test, **10**.
See also *Pasteurella* Infection, immunization, treatment.
Immunization. Serotherapy of *Pasteurella* infection in cattle and buffaloes, **577** ; vaccination against fowl cholera, **823** ; avirulent strains of *Past. pestis* in preparation of plague antiserum, **411**.
In Swine. In Annam, **77**.
Treatment. By sulphamide compounds, **293** ; sulphanilamide in fowl cholera, **874**.

PAST. PESTIS. See *Pasteurella* Group; *Pasteurella* Infection, immunization.
PAST. PSEUDOTUBERCULOSIS INFECTION. In hares in Yugoslavia, **576**; pathology, **78**; in chicks, **9**.
See also *Pasteurella* Group.
PASTEURIZATION. See Milk, pasteurization.
PASTURES. See Cobalt, general; Helminth Parasites, control; Strongyles; Technique, helminthological.
PATHOLOGY. Text-books, **482**, **571**; role and limits of histopathology in medicine and biology, **477**; use of statistics in pathology, **312**.
PELLAGRA. See Blood, coagulation; Vitamins, vitamin B complex.
PERITONEUM. Diffusion of calcium, magnesium and phosphorus into the peritoneum: effect of intravenously injected calcium salts and of parathyroid hormone, **215**.
PERITONITIS. Treatment by prontosil in dogs, **56**.
PEROSIS. Effect of certain mineral salts on the amount and severity of, **118**; assimilation and storage of manganese in the developing embryo and growing chick, **118**.
PEYER'S PATCHES. See Rinderpest, immunization.
PFEIFFERELLA MALLEI INFECTION [GLANDERS].
General. In the U.S.A., **898**; in American army animals in China, **576**; artificial infection of the goat, sheep, and dog, **654**; variant types of *Bacillus mallei*, **738**.
Diagnosis. Death in a horse after a mallein test, **355**; titration of mallein *in vivo* and *in vitro*, **937**; production of an anti-mallein serum, **436**.
PHAGOCYTOSIS. Quantitative aspects of phagocytosis as influenced by the number of bacteria and leucocytes, **882**; action of gastric and salivary mucin on, **882**.
PHARMACOLOGY. See Therapeutics.
PHEASANTS. See *Capillaria*; *Eimeria* Infection; Fowl Paralysis.
PHENOTHIAZINE. Anthelmintic efficiency, **877**; of crude unconditioned phenothiazine in horses and sheep, **878**; dosing of sheep, **876**.
See also *Lyperosia*; Nematodes, general; *Oesophagostomum*; *Trichostrongylus*.
PHENYL MERCURIC ACETATE. See *Mycobacterium tuberculosis*, viability.
PHENYLAMINE SULPHAMIDE. See Gastro-Enteritis, infectious feline; Sulphamide Compounds.
PHILIPPINE ISLANDS. Control of animal diseases in, **359**.
See also Committees; *Corynebacterium ovis* Infection [Caseous Lymphadenitis]; Food Inspection, meat inspection; Fowl Plague; Helminth Parasites, of horses; *Pasteurella* Infection, in buffaloes; Strongyles; Swine Fever, general.
PHLEBOTOMUS. See Leishmania Infection, transmission.
PHOSGENE. See Gases, poisonous.
PHOSPHATASE TEST. See Milk, pasteurization; Rickets.
PHOSPHIDES. See Poisoning, metals metalloids and salts.
PHOSPHORUS. Importance of phosphorus content of diet, **367**; effect on growing pigs of rations containing different levels of phosphorus in the absence of vitamin D, **541**; effect of phosphorus deficiency on protein and mineral metabolism of sheep, **117**; on mineral metabolism, growth and symptomatology of rats, **284**; response of phosphorus-deficient rats to vitamin D_2, **613**.
See also Haemoglobinaemia; Minerals; Rickets.
PHOTOSENSITIZATION. See Eczema.
PHYSIOLOGY GENERAL. Text-book, **404**.
See also Adrenal Gland; Blood; Bones; Digestive System, general; Heart; Metabolism, general; Muscles; Nervous System; Ovary; Respiration; Stomach; Temperature; Udder; Urine.
PHYTOLACCA DODECANDRA. See Poisoning, plants.
PICA. In cattle, **198**; in Northern Schleswig, Germany, **611**; the thymus of affected cattle, **285**; magnesium content of the urine, **48**; manganese in urine and faeces, **119**.
PIGEONS. See Blood, formation; *Brucella* Infection, in poultry; Helminth Parasites; Pox, in birds; *Salmonella* Infection; *Trichomonas* Infection.
PIGLETS. See Anaemia, Equine Infectious, transmission; Digestive System, diseases; Dysentery, of swine; Liver, diseases; *Salmonella* Infection [Paratyphoid], in swine; Swine; Swine Fever, immunization.
PIGMENTATION. See Liver, diseases.
PIGMENTS. See Biochemistry; Blood, pigments.
PIGS. See Swine.
PINE DISEASE. Border pine, **117**; in sheep, **541**; cobalt in the control of, **117**; Northumbrian pining not curable by cobalt administration, **856**.
PIROPLASMIN. See *Theileria* Infection, treatment.
PIROPLASMOSIS. See *Babesia* Infection.
PITUITARY GLAND.
General. Relation of the anterior pituitary to sex and metabolism, **142**; changes induced by administration of pituitary extract, **715**; the pharyngeal pituitary, **559**.
See also Hormones, general, sex hormones; Ketosis.
Growth Hormone. Effects of anterior pituitary hormone on skeletal tissues of g. pigs, **967**; growth processes in cartilage and bone of g. pigs after gonadectomy and administration of anterior pituitary extract of cattle, **715**.
Lactogenic Hormone. Mammogenic hormones of the anterior pituitary: the duct growth factor, **714**.
Thyrotrophic Hormone. Formation of antihormones by pituitary preparations containing, **389**.
PLACENTA. Permeability to antibodies, **602**; placental transmission of sulphanilamide, **552**.
See also Hormones, sex hormones.
PLANT POISONING. See Poisoning, cyanide, plants.
PLASMODIUM INFECTION [MALARIA].
General. Protein tyrosin reaction in diagnosis, **501**; serum changes in fowls infected with *P. gallinaceum*, **20**; endothelial schizogony in *P. gallinaceum*, **415**; incidence in relation to the mode of infection, **170**; *P. lophurae* n. sp., pathogenic for fowls, **20**; duration of *P. relictum* infection in canaries, **247**; attempt to cultivate *P. gallinaceum*, **247**; periodicity in the asexual and sexual cycles of avian plasmodia, **919**; respiratory metabolism of *P. knowlesi*, **500**.
Immunity. Passive immunity in birds, **833**; active and passive in chickens against *P. lophurae*, **832**; cross-immune relationship of *P. cathemerium* and *P. relictum*, **501**.
Treatment. Action of anti-malarial drugs on *P. gallinaceum* infection, **960**; of oxy (dimethylaminobutyl amino) quinoline on *P. gallinaceum* and *P. falciparum*, **126**; adrenalin in malaria, **295**.
PLEURISY. In elephants, **361**.
PLEURO-PNEUMONIA.
General. Studies of pleuropneumonia-like organisms, **582**; rolling disease: a new syndrome in mice associated with a pleuropneumonia-like organism, **27**.
Bovine Contagious. In British India, **512**; in North Queensland, Australia, **568**; lungsickness campaign in the Caprivi Zipfel, South Africa, **89**; vaccination with pleural exudate incorporated in lanolin, **512**; with formolized vaccine, **172**; testing immunity following vaccination, **511**; transmission, **511**.
In Goats. Lesions in, **692**; prophylactic use of gravidan, **556**; treatment in the USSR with novarsenol, **619**.
PNEUMONIA, GENERAL. Pathology in calves, **187**; mineral content of the lungs of sheep with "lunger" disease, **534**; influence of oxygen and carbon dioxide on the blood of pneumonic dogs, **556**; sodium sulfapyridine in the treatment of pneumonia, **618**.
See also Influenza, in horses; *Streptococcus* Infection, in horses; *Syngamus*.
POISON GAS. See Gases, poisonous.
POISONING.
General. In domestic and wild animals, **106**; chemical potentials as indices of toxicity, **128**; fluorine poisoning, **380**; in domestic animals, **464**; occurrence, pathological aspects, and treatment of fluoride waters, **297**; influence of olive oil emulsions on the actions of alkaloids, **623**; acute nicotine poisoning in man and animals, **879**; protein poisoning in livestock, **379**; poisoning by molasses, **383**; *Tilletia* and *Ustilago* as causes of disease in domestic animals, **559**; blue-green algae poisonous to livestock and poultry, **465**; poisoning of dogs by the giant toad, *Bufo marinus*; treatment with nembutal, **297**.
See also Atoxyl; Carbon Tetrachloride; Cod Liver Oil; Gases, poisonous; Glossitis; Glutathionaemia; Snake Bite; Snake Venom; Sulphamide Compounds, toxicity.
Cyanide. Sensitivity of the picrate paper test (Guignard test) for HCN, **383**; toxicity of potassium cyanide for swine, **465**; inhibitory effects of chronic poisoning by foods containing cyanic substances, **59**; cyanogenetic constituents of Australian and other plants, **382**; of some Queensland plants, **568**; of *Lotus australis* and *Heterodendron oleaefolium*, **297**; sorghum poisoning, **465**; HCN content of sorghum and sorghum silage, **558**; toxicology of linseed plant and cake, **382**.
See also Poisoning, plants.
Metals, Metalloids and Salts. Animal poisoning by industrial waste gases, **710**; by chimney smoke containing copper and arsenic, **710**; diagnosis of arsenical poisoning of stock, **796**; arsenic in soils and waters in New Zealand, and its relation to stock health, **381**; toxicity of dipping fluids containing arsenic and sulphur, **130**; toxicity to sheep of lead arsenate and its spray residues, **964**; effects of ingested lead on rats and dogs, **878**; zinc poisoning in domestic animals, **557**; poisoning of domestic and wild fowls by metal phosphide, **557**; poisoning of cattle by

POISONING—Metals, Metalloids and Salts [cont'd].
saline bore water, **129**; chronic salt poisoning in cattle, **379**; salt and brine poisoning of pigs, **380**.
See also Selenium.
Plants. Poisonous plants of the U.S.A., **131**, **156**, **796**; of Australia, **130**; of French West Africa, **558**; toxicity of poisonous plants in Africa, **711**; poisoning with *Phytolacca dodecandra* in sheep in East Africa, **132**; with *Tribulus terrestris* in sheep and goats in the USSR, **711**; chemical composition of *Suckleya suckleyana*, **624**; *Hoya australis*; a plant poisonous to stock, **131**; effect of *Centaurea picris* on domestic animals in the USSR, **623**; poisoning of livestock by sugar-beet, **213**; feeding stuffs and suspected poisoning in the U.S.A., **379**; plant poisoning in horses, **879**; so-called cornstalk poisoning in cattle, **623**; nitrate as the cause of oat-hay poisoning in cattle, **131**; rye-grass poisoning in wild animals in captivity, **131**; poisoning of cattle by gossypol through cotton-seed oil cake, **623**; toxicity of the coffee bean (*Sesbania vesicaria*) for sheep, **132**; of lily of the valley and oleander leaves for fowls, **624**.
See also Poisoning, cyanide.
POLAND. See Encephalomyelitis, General.
POLIOMYELITIS. In pigs and cattle, **675**; sparing effect on poliomyelitis of simultaneous distemper and lymphocytic choriomeningitis viruses in dog spleen, **674**; antibodies in the serum of poliomyelitis patients, **771**.
PORPHYRINS. Relation to the metabolism of blood pigments, **627**; spectrography of a combined form of urinary coproporphyrin, **627**.
See also *Theileria* Infection.
PORPHYRINURIA. Congenital porphyrinuria ("pink tooth") in cattle, **41**, **948**; porphyria of the bones of a cow, **777**; significance in meat inspection, **778**.
See also Sulphamide Compounds, toxicity.
PORTUGAL. See Law; *Mycobacterium tuberculosis* Infection, in cattle, control, in fowls, in swine; Parasitic Infestation, general; Rabies, treatment; Services, veterinary.
POTASSIUM. See Blood, chemical composition, pressure.
POULTRY, GENERAL. See Ducks; Eggs; Fowls; Geese; Pigeons; Turkeys.
POX.
General. Susceptibility to cow pox of other domestic animals, **177**; vaccinia virus as the cause of milker's nodules, **256**.
In Birds. In turkeys, **177**; pigeon pox in India, **516**; immunization against fowl pox with fowl- and pigeon-pox viruses, **930**; immunization against fowl pox and pigeon pox with viruses propagated on the chorio-allantois, **929**; antigenic value of fowl pox virus adsorbed on charcoal, **177**; treatment of canary pox by mercurochrome, **125**.
In Cattle. Diagnosis of, and vaccination against "udder pox" in cattle, **93**.
In Goats, 676.
In Sheep. Sheep pox sensitized vaccine, **926**.
See also Dermatitis, contagious pustular.
Virus. Behaviour of pox viruses in the respiratory tract, **26**; immunity relations between the Shope fibroma virus, the myxomatosis virus and the neurolapin (pox) virus, **27**; dissemination of nasally instilled vaccinia virus, **256**; combination of vaccinia with anti-vaccinial serum, **256**; changes in the smallpox virus, **841**; vaccinia elementary bodies, **94**, **589**; constituents of, **589**; pH stability of, **589**; inclusion bodies and E.B.'s of vaccinia, **339**; ultraviruses and fluorescence. I. Behaviour of vaccinia E.B.'s towards ultra-violet rays in a fluorescent medium, **94**; —. II. E.B.'s of vaccinia and vaccinial keratitis; method of counting by fluorescence, **589**; —. III. Vaccinia virus, **676**.
PRECIPITIN TEST. See under name of specific infection.
PREGNANCY.
General. Physical conditions in the uterus governing duration of pregnancy, **472**.
See also Hormones, sex hormones; Neoplasms, endocrine system in relation to; Parturition.
Diagnosis. Of equine pregnancy, **470**; by biological and chemical methods, **215**; early diagnosis in cows and mares, **61**.
Diseases. Fatty infiltration of the liver in pregnant ewes, **686**.
See also Haemoglobinaemia; Ketosis; Toxaemia.
PRESERVATION OF BIOLOGICAL PRODUCTS. See Biological Products, preservation.
PRESERVATION OF FOOD. See Food Preservation.
"PRICKLY HEAT". See Microfilariae.
PROACTINOMYCES, 83.
PROGESTERONE. See Hormones, sex hormones.
PROLAN. See Hormones, sex hormones; Sterility, control.
PRONTOSIL, PRONTYLIN. See Sulphamide Compounds.
PROSTATE GLAND. See Bacteria General, bactericidal agents.
PROTEUS. Isolation of *Fusiformis necrophorus* in the presence of, **82**.
PROTOSTRONGYLUS. From the lungs of sheep, **349**.
See also Lungworms.
PROTOZOA, GENERAL. Protozoan diseases of stock, **243**; in French Equatorial Africa, **915**; reciprocal influence of avitaminosis A and C and intestinal parasitism by protozoa, **546**; techniques for diagnosis of protozoa in faeces, **394**; evolution, **333**.
See also *Aegyptianella*; *Anaplasma*; *Babesia*; *Balantidium*; *Bartonella*; *Cheliomastix*; *Eimeria*; *Entamoeba*; *Eperythrozoon*; *Histomonas*; *Isospora*; *Leishmania*; *Leptospira*; *Leucocytozoon*; Parasitic Infestation, general; *Plasmodium*; *Rickettsia*; *Spirochaeta*; *Theileria*; Ticks, diseases transmitted by; *Toxoplasma*; *Treponema*; *Trichomonas*; *Trypanosoma*.
PSEUDORABIES. See Aujeszky's Disease.
PSEUDOTUBERCULOSIS. See *Pasteurella pseudotuberculosis* Infection.
PSITTACOSIS. In wild parrots in Australia, **516**; in imported psittacine birds from South America and Australia, **677**; outbreak at the London Zoological Gardens, **426**; complement-fixation test in diagnosis, **272**, **677**; experimental pulmonary psittacosis in mice, **931**; experimental immunity in mice, **677**; the virus of psittacosis, I, II, III, **517**.
PUBLIC HEALTH. See Food Inspection; Food Poisoning; Milk, bacterial content, diseases transmitted by, hygiene; *Mycobacterium tuberculosis* Infection, meat inspection, in milk; Rabies, immunization; Reports; Vermin Control.
PUERTO RICO. See *Lyperosia*.
PULLORUM DISEASE. See *Salmonella pullorum* Infection [Bacillary White Diarrhoea].
PULPY KIDNEY DISEASE. See *Clostridium* Infection, General, in sheep.
PURIFIED PROTEIN DERIVATIVE. See *Mycobacterium tuberculosis*, tuberculin.
PURPURA. In goats, **445**; thrombopenic purpura in the dog, **953**; platelet-reducing extracts of the spleen, **954**.
See also Vitamins, vitamin P.
PUS. See Milk, cell content; *Salmonella* Infection, general.
PYOMETRA. See Uterus, diseases.
PYRETHRUM. Deterioration, **962**.
See also *Ascaris*; Insecticides.

Q

"Q" FEVER. See *Rickettsia* Infection.
"QUAIL DISEASE", 827.
QUARANTINE. Quarantinable diseases of animals in Australia, **64**.
QUINOLINE. See *Plasmodium* Infection, treatment.

R

RABBITS. See Brain, diseases; Carcinoma; Digestive System, general; *Eimeria* Infection [Coccidiosis]; Fibroma; Myxoma; Neoplasms, general; *Trichostrongylus*; Viruses, rabbit viruses.
RABIES.
General. In Palestine, **724**; in animals in the U.S. army, **672**; in dogs in the U.S.A., **898**; in dogs in Alabama, U.S.A., **840**; in cattle and solipeds in South America, **840**; comparison of the mouse and g. pig inoculation methods of diagnosis, **255**; epidemiologic and immunologic experiments, **254**; rabies in apparently normal dogs, **927**; atypical rabies, **928**.
Control. In Yugoslavia, **421**; in Europe generally, **402**; in Alabama, U.S.A., **672**; law regarding rabies control in France, **672**; compulsory inoculation of dogs against rabies and its public health aspect, **93**, **424**.
See also below.
Immunization. Preventive vaccination in Morocco, **424**; in cattle in Brazil, **840**; in tropical and subtropical countries, **588**; in Algeria with formolized vaccine, **588**; at the Pasteur Institute of India, Kasauli, 1937, **93**; at the Haffkine Institute, India, 1938, **760**; at the Câmara Pestana Institute, Portugal, 1935-37, **515**; curative vaccination of domestic animals, **588**; rabicidal power of dog serum after injection of various kinds of vaccine, **515**; changes in the central nervous system after antirabic vaccination of dogs, **92**; immunizing potency of antirabies vaccines [review], **673**; mouse potency test of, **26**; avirulent vaccines, **515**; protective value of single and multiple injections of phenol-killed rabies vaccine, **927**; passive immunization against street-virus rabies in mice, **673**.
See also Rabies, control.
Transmission. Carriers in South Africa, **672**; bats as carriers, **92**, **927**.

RABIES [cont'd].
Treatment. Ineffectiveness of sulphanilamide, **554**; curative vaccination, **588**.
See also Rabies, control, immunization.
Virus. Presence in the eye, **514**; effect of desiccation on the virus, **673**, **928**; phenol and common salt solution as a preservative, **93**; cultivation on the chorio-allantois, **255**, **760**.
RACCOON DOGS. See *Toxoplasma* Infection.
RACCOONS. See Laryngo-Enteritis, infectious.
RADIOACTIVE ISOTOPES. See Iron; Metabolism, general; Rickets.
RADON. See *Mycobacterium tuberculosis*, vaccine.
RAIGAN. See *Taenia*.
RAILLIETINA. Development cycle, **347**; of *R. cesticillus*, **32**; of *R. echinobothrida* and *R. tetragona*, **593**.
RAT ANTIDERMATITIS FACTOR. See Vitamins, vitamin B_6
RAT-BITE FEVER. See *Spirillum* Infection.
"RATIN" AND "RATININ". See Vermin Control.
RATS. An infective disease of uncertain aetiology in laboratory rats, **536**.
See also Arthritis; *Leptospira* Infection; Lethal Factors, hereditary; Neoplasms; *Salmonella* Infection; *Trypanosoma* Infection; *Trypanosoma cruzi* Infection [Chagas' Disease]; Vermin Control.
RED BLOOD CORPUSCLES. See Blood, corpuscles [red].
REDUVIIDAE. See *Trypanosoma cruzi* Infection [Chagas' Disease].
REDWATER. See *Babesia* Infection [Piroplasmosis].
REDWORM IN HORSES. See *Strongyles*.
REFRIGERATION. See Neoplasms, general; Spirochaetes; Viruses General, preservation.
REGULATIONS. See Law.
REINDEER. See *Eeusipelothrix rhusiopathiae* Infection [Swine Erysipelas].
REPELLENTS. Chemical control of insect pests of animals, **342**; possibilities of cattle fly sprays in India, **961**; rapid determination of toxicity of livestock sprays, **961**.
See also Dips; Insecticides; Myiasis; Poisoning, metals metalloids and salts.
REPORTS.
Albania. Veterinary Service, 1928-38, **569**.
Algeria. Pasteur Institute, 1937, **308**.
Angola. Statistical report of veterinary work, 1931-35, **980**.
Australia. Veterinary Medicines, Pest Destroyers, and Stock Foods Investigation Branch, 1937-38, **638**; South Australia, Council of the Institute of Medical and Veterinary Science, 1938-39, **892**; New South Wales, Live Stock Diseases Report No. 14, 1937-38, **637**; Queensland, Report of Agricultural Chemist, 1937-38, **568**; Queensland, Animal Health Station, Yeerongpilly, 1936-37, **150**; —, 1937-38, **567**.
Basutoland. Veterinary and Livestock Division, 1937-38, **724**.
British Honduras. Report on livestock, 1938, **308**.
British Somaliland. Veterinary and Agriculture Department, 1938, **477**.
British West Indies. Report of Veterinary Officer, Antigua, 1938, **643**.
Burma. Civil Veterinary Department, 1936-37, **639**.
Canada. Report of Veterinary Director-General, 1937-38, including Contagious Diseases Division, Division of Animal Pathology, Meat and Canned Foods Division, **305-306**; work on pathology and bacteriology at Ontario Research Foundation, 1938, **307**.
Ceylon. Report of Government Veterinary Surgeon, Department of Agriculture, 1937, **893**; —, 1938, **811**.
China. Work on parasitology at Henry Lester Institute of Medical Research, Shanghai, 1937-38, **678**.
Cyprus. Veterinary Service, 1938, **809**.
Denmark. Veterinary Directorate, 1937, **66**; —, 1938, **644**.
Dutch East Indies. Veterinary Institute, Buitenzorg, Java, 1937, **68**; —, 1938, **480**.
Eire. Veterinary Research Laboratory, 1938-39, **978**; Veterinary College of Ireland, 1938-39, **978**; report on Diseases of Animals (Ireland) Acts, 1894-1938, and Dogs' Act (1906), 1938-39, **978**.
Europe. Animal disease situation in 1938, **565**; report of the Director, *Office International des Epizooties*, 1938-39, **565**; work of health organization, League of Nations, 1938-39, **402**.
See also Hormones, general.
Finland. Helsingfors Milk Control Station, 1936, **67**.
France. Veterinary Services of Paris and Department of the Seine, 1937, **152**; —, 1938, **224**; Military Veterinary Research Laboratory, 1937, **308**; French army in France, Algeria, Tunisia, Morocco, and the Levant, **224**.
Gambia. Report of veterinary district work, 1938-39, **568**.
Germany. Report of Government Veterinarians, Prussia, 1935 and 1936, **725**; animal diseases and abattoir returns, 1936, **570**.
Gold Coast. Department of Animal Health, 1938-39, **307**.
Great Britain [Central Government Departments]. Report of Chief Medical Officer of Ministry of Health, 1938, **397**; Army Veterinary Services, 1938-39, **722**; Colonial Advisory Committee, 1938-39, **977**; Development Commissioners, 1938-39, **636**.
See also Committees.
Great Britain [Municipal and County Reports]. Extracts from municipal veterinary reports of Birmingham 1940, Cardiff 1939, Manchester 1939, Newcastle-upon-Tyne 1939, Preston 1939, Salford 1938 and 1939, West Ham 1938, [table], **976-77**; county veterinary and food inspection reports of Dumfries 1936, Lanark 1937, London 1937, Somerset 1937, Wilts 1937 and 1938, **640-641**.
Great Britain [Research Work]. Royal Veterinary College, 1939, **807**; Moredun Institute, Gilmerton, 1937-38, **304**; National Institute for Research in Dairying, 1938, **398**; veterinary department, South Eastern Agricultural College, Wye, 1938, **565**; London School of Hygiene and Tropical Medicine, 1936-37, **147**; —, 1937-38, **974**; National Institute for Medical Research, 1938-39, **808**; Medical Research Council, 1938-39, **807**; Imperial Cancer Research Fund, 1937-38, **223**; British Empire Cancer Campaign, 15th annual report, **66**; —, 16th annual report, **566**.
Hawaii. Extracts from report of Agricultural Experiment Station, 1938, **481**.
Holland. Report of the Chief Veterinary and Public Health Inspector, 1938, **570**; Animal Health Service, Friesland, 1938-39, **480**; State Veterinary Research Institute, Rotterdam, 1936 and 1937, **479**; State Serum Institute, 1937, **479**; —, 1938, **979**.
Hong Kong. Report of Colonial Veterinary Surgeon, 1938, **725**.
Hungary. National Animal Health Institute, Budapest, 1937, **727**.
India. Agriculture and Animal Husbandry, 1936-37, **722**; Imperial Council of Agricultural Research, 1938-39, **808**; Civil Veterinary Departments of Hyderabad Deccan, 1936-37, Assam, Baluchistan, Bengal, Bihar, Bombay, Central Provinces and Berar, Mysore, Punjab, United Provinces and the veterinary colleges of Bengal and Bombay, 1937-38 [table], **219-223**; Pasteur Institute of India, Kasauli, 1937, **894**; Pasteur Institute of Southern India, Coonoor, 1938, **979**; proceedings of the Animal Husbandry Research Workers' Conference, New Delhi, February 1936, **307**; of the 24th Indian science congress, Hyderabad, 1937, **719**; of the 25th Indian science congress, Calcutta, 1938, **720**; Army Veterinary Service 1937-38, **65**; —, 1938-39, **979**.
Indochina. Pasteur Institutes in Indochina, 1937, **981**; Pasteur Institute, Nhatrang, 1937, **225**.
Italy. Veterinary Service, Rome, 1929-35, **570**; Venezia; Animal Diseases Institute, Padua, 1937, **225**.
Jamaica. Report of Senior Veterinary Officer, 1938, **643**.
Kenya. Veterinary Department, 1938, **811**.
Levant. Army Veterinary Research Laboratory, 1937, **224**.
Madagascar. Pasteur Institute, Antananarivo, 1938, **897**.
Malaya. Veterinary Departments, 1938, **894**.
Malta. 2nd report of the *Brucella melitensis* Research Station, **496**.
Mauritius. Veterinary Division, 1937, **402**.
Morocco. Research Laboratory of the Livestock Service, 1937, **308**; —, 1938, **727**; Army Veterinary Laboratory, 1937, **308**; —, 1938, **896**.
New Zealand. Department of Scientific and Industrial Research, 1936-37, **640**; Director-General of Agriculture, 1938-39, **723**.
Nigeria. Veterinary Department, 1937, **568**; report of Veterinary Pathologist, 1937, **639**.
Northern Rhodesia. Veterinary Department, 1937, **150**; —, 1938, **642**; report of Veterinary Research Officer, 1937, **151**; Central Research Station, Mazabuka, 1938, **643**.
Nyasaland. Veterinary Department, 1938, **478**; report of the medical entomologist, 1938, **843**.
Palestine. Report of the Chief Veterinary Officer, 1938-39, **810**; Department of Health, 1938, **724**.
Sierra Leone. Report on livestock, 1937, **152**.
Southern Rhodesia. Report of Chief Veterinary Surgeon, 1937; **893**; —, 1938, **399**; report of Director of Veterinary Research, 1938, **723**; Division of Entomology, 1938, **399**.
Sudan. Veterinary Service, 1938, **399**; report of Senior Veterinary Research Officer, 1938, **400**.
Sweden. Civil Veterinary Report, 1937, **152**; —, 1938, **645**.
Trinidad and Tobago. Veterinary Division, 1938, **725**.
Tunisia. Livestock Service, 1938, **896**; Pasteur Institute, 1938, **309**.
Uganda. Veterinary Department, 1938, **401**; report of Senior Veterinary Research Officer, Entebbe, 1938, **401**.
Union of Socialist Soviet Republics. Work of the Uzbek Veterinary Research Institute, 1935, **727**.

REPORTS [cont'd].
Union of South Africa. Report of Director of Abattoir, Live Stock Markets, Veterinary Services, Johannesburg, 1937-38, **398** ; —, 1938-39, **638**.
United States of America. Report of Chief of Bureau of Animal Industry, 1937-38, **897** ; Division of Animal Industry, Department of Agriculture, California, 1936 and 1937, **814** ; Commissioner on Domestic Animals, Connecticut, 1937-38, **981** ; Division of Veterinary Science, Michigan State College, 1937-38, **153** ; —, 1939, **815** ; work on animal pathology of the Michigan State College, 1937-38, **645** ; New York State Veterinary College, 1937-38, **899** ; items of veterinary interest from reports of Agricultural Experiment Stations of Hawaii 1938, Idaho 1937-38, Indiana 1937-38, Kansas 1936-38, Maryland 1937-38, Nebraska 1938, Nevada 1936-37, Pennsylvania 1937-38, Washington 1937-38, West Virginia 1936-38, Wisconsin 1938-39, **481-483** ; Veterinary Division, U.S. Army, 1936, **226** ; —, 1938, **728** ; —, 1939, **813**.
See also *Brucella* Infection, general ; Committees ; *Salmonella pullorum* Infection [Bacillary White Diarrhoea], control.
Yugoslavia. Work in the Institute of Microbiology and Veterinary Hygiene, Zagreb University, and at the Veterinary Experimental Station of the Ministry of Agriculture, Zagreb, 1930-38, **309**.
REPRODUCTIVE ORGANS. See Genital System.
RESEARCH, GENERAL. In Southern Rhodesia, **633** ; in India, **218** ; recent contributions to veterinary science by Australian and New Zealand workers, **146** ; the experimental method in the conquest of disease, **974** ; principles of medical research, **64** ; problems of chance in research, **146**.
RESEARCH INSTITUTES, BODIES AND FACULTIES. Central veterinary research institute for East Africa, Kabete, Kenya, **633** ; poultry regional research laboratory, East Lansing, Mich., U.S.A., **65** ; All-Union Institute of experimental veterinary science at the All-Union Agricultural Exhibition, USSR, **972**.
See also Reports ; Swine Fever, virus.
RESPIRATION. Tissue respiration, **383** ; effect of asphyxia on respiratory movement of the sheep foetus, **626**.
RESPIRATORY SYSTEM.
General. Of the elephant, **361** ; of the chicken, **143** ; the air stream in the lung of the fowl, **967** ; pulmonary epithelium and proliferative reactions in the lungs, **43**.
Diseases. Interalveolar communications in normal and in pathologic mammalian lungs, **386**.
See also Adenoma ; Bronchopneumonia ; *Fasciola* ; Lungworms ; Neoplasms ; *Pasteurella* Infection, in cats ; Pleuropneumonia ; Pneumonia ; Pox, virus ; Silicosis.
Introduction of Infection By. See Bacteria General, haemophilic ; Pox, virus.
RETICULO-ENDOTHELIAL SYSTEM. Effect of 1 : 2 : 5 : 6-dibenzanthracene on the R.E.S. of rabbits, **212**.
See also Neoplasms, general.
REVIEWS. Biennial reviews of the progress of dairy science : milk-borne diseases, **123**.
RHIPICEPHALUS. See Paralysis, tick ; Ticks.
RIBOFLAVIN. See Vitamins, vitamin B_2.
RICKETS, 198, 542 ; separation of the epiphysis from the head of the femur in a rickety foal, **366** ; blood changes in canine rickets, **51, 366** ; in pullets, **864** ; cereals and rickets : availability of phytin-P to the chick, **120** ; rachitogenic properties of cereals in chick rations, **199** ; phosphatase actions of tissues of normal and rachitic rats, **469** ; study of phosphorus metabolism in rachitic chickens with a radioactive phosphorus isotype, **863** ; of rachitic bone structure by photomicrography, **457** ; manganese rickets in rats, **285**.
See also Vitamins, vitamin D.
RICKETTSIA INFECTION, 753 ; of domestic animals, **503** ; in South Africa, **503, 754, 940** ; *R. bovis* infection in Algeria, **834** ; *R. conjunctivae* in sheep in the French Congo, **663** ; canine rickettsiasis in the French Congo, **663** ; rickettsial conjunctivitis of ruminants, **418** ; comparison of strains from infected ticks in Montana, U.S.A., and from "Q" fever in Australia, **834** ; the American dog tick, eastern carrier of Rocky Mountain spotted fever, **260** ; infectious agent from *Amblyomma maculatum* in the U.S.A., **98** ; local immunity reactions caused by repeated inoculations with rickettsiae, **663** ; ulcron in the treatment of heartwater, **958** ; influence of arsenical compounds on the development of *R. ruminantium*, **958** ; evolution of rickettsiae, **333** ; preservation, **884** ; rapid staining with thionin, **630**.
See also Ticks, diseases transmitted by.
RIFT VALLEY FEVER. Control in Kenya, **942** ; vaccination, **256** ; serum virus vaccination, **519** ; serum treatment, **256**.
RINDERPEST.
General. In Macina, French Sudan, **249** ; in southern Africa, **87** ; control in Kenya, **941**.
Immunization. Vaccination of cattle in Gambia, **568** ; in Indo-China, **88** ; serum protein changes during immunization, **510** ; goat virus vaccination in the Central Provinces and Berar, India, **510** ; goat tissue virus immunization in sheep, **510** ; use of dried goat spleen, **758** ; respective merits of virus alone and serum cum virus, **757** ; relationship between the degree of reaction and immunity in serum virus inoculation, **670** ; vaccination with formolized testicular tissue, **420** ; with the thymus of affected calves, **420** ; with Peyer's patches from affected calves, **671** ; with saponin virus, **88** ; technique of vaccine preparation, **88** ; effect of coating virus in lanolin, **420**.
Virus. Vitality in calves with rinderpest, **925** ; preservation in the presence of buffer phosphates, **420** ; action of normal bile on, **335** ; effect of trypanblue on goat blood virus, **858** ; viability at incubator temperatures, **585**.
RINGWORM. Dermatomycosis of animal origin in man, **659** ; silver foxes as a source of trichophyton ringworm in man, **83** ; experimental trichophytid in guinea pigs, **583** ; cultural characters of *Microsporon*, **84** ; action of staphylococci on *M. felineum* in culture, **84**.
RIVANOL. See *Brucella* Infection, treatment.
ROCKY MOUNTAIN SPOTTED FEVER. See *Rickettsia* Infection.
RODENTS. See Ground Squirrels ; Hamsters ; Hares ; Mice ; Rabbits ; Rats ; Vermin Control ; Voles.
ROECKL'S GRANULOMA. See Granuloma.
ROLLING DISEASE. A new syndrome in mice associated with a pleuropneumonia-like organism, **27**.
ROTENONE. See Derris ; Insecticides.
RUMANIA. See Oestridae, bots ; *Trichomonas* Infection, in cattle.
RUMEN. Motility of the sheep rumen under various conditions, **967** ; factors affecting passage of liquid into the calf's rumen, **384** ; pH values of the ingesta of the bovine rumen, **628** ; enzyme action of the contents, **137** ; rumen digestion studies, **880**.
See also Foot and Mouth Disease, pathology.
RUMINANTS. See Acidosis ; Antelopes ; Anthelmintics ; Blood, chemical composition, serum ; Buffaloes ; Cattle ; Deer ; Digestive System, general ; Goats ; Helminth Parasites, control, nutrition in relation to, of ruminants ; *Listerella* Infection ; Metabolism, general ; Milk ; Nutrition, general ; *Rickettsia* Infection ; Sheep ; Stomach ; Strongyles ; *Trypanosoma* Infection ; Vitamins, vitamin B complex ; Yak.
RUSSIA. See Union of Socialist Soviet Republics.
RYE GRASS POISONING. See Poisoning, plants.

S

SALIVA. See Anaemia, Equine Infectious, virus.
SALIVARY GLANDS. See *Brucella* Infection, diagnosis [general].
SALMONELLA GROUP.
General. Comparative studies of *S. pullorum* and *S. gallinarum*, **495** ; types of *S. typhi-murium*, **10** ; the monophasic non-specific *Salmonella* types, **324** ; somatic and "X" agglutinins to the *Salmonella* group, **11** ; in ducks, **579**.
Antigens. Nature of O and Vi antigens of *S. typhi*, **39** ; relation of the Vi antigen to the other antigenic factors, **239** ; immunological relationships of polysaccharides of the typhoid-salmonella group, **11**.
Cultivation. New faecal enrichment method for *Salmonella*, **495** ; synthetic polytropic media for differentiation from other bacteria, **884**.
SALMONELLA INFECTION [PARATYPHOID].
General. Epidemiology, **10, 824** ; types of *Salmonella* in slaughtered animals in Germany, **550** ; *S. newport* in domestic animals, **12** ; reaction of chickens to the colon-paratyphoid group of bacteria, **738** ; paratyphoid infection in pigeons, **40** ; *S. typhi-murium* infection in man, **53** ; *S. choleraesuis* and *S. typhi-murium* as pus-forming organisms, **824**.
In Cattle. In the faeces, **238** ; control of *S. enteritidis* infection, **550, 911**.
In Ducks, 13 ; mortality among ducks due to *S. typhi-murium*, **825** ; agglutinins in ducks and drakes from hatching to maturity, **579**.
In Eggs. In ducks' eggs, **206** ; food poisoning from seagulls' eggs (*S. typhi-murium*), **54**.
In Horses. In the faeces, **238**.
See also *S. abortus-equi* Infection.
Immunity. Active immunity against *S. enteritidis* infection, **37** ; role of inborn resistance factors in infected mice, **529**.
In Meat. *S. enteritidis* var. *derby* in swine and its importance in bacteriological meat inspection, **205** ; *S. choleraesuis* in bacteriological meat inspection, **54**.

SALMONELLA INFECTION [PARATYPHOID] [cont'd].
In Milk. Two epidemics from milk-borne infection in Dundee during 1923-38, **204**.
In Rats. See Vermin Control.
In Sheep. In the faeces, **238**.
In Swine, 163, 911; paratyphoid in young pigs, **360**; *S. choleraesuis* in the faeces of normal swine, **238**.
See also *Salmonella* Infection, in meat.
S. ABORTUS-EQUI INFECTION [EQUINE ABORTION], 823.
S. AERTRYCKE. Attempt to produce lymphomatosis in chickens by injections with *S. aertrycke* and lymphomatous nerve tissue, **364**.
S. CHOLERAE-SUIS. Some aetiological, epidemiological and clinical aspects of *S. cholerae-suis* var. *kunzendorf*, **79**.
See also *Salmonella* Infection, general, in meat, in swine.
S. ENTERITIDIS. See Bacteria General, antagonism; *Salmonella* Infection, in cattle, immunity, in meat.
S. GALLINARUM INFECTION [FOWL TYPHOID]. In Scotland, **655**; in Hungary, **12**.
See also *Salmonella* Group, general.
S. NEWPORT. See *Salmonella* Infection, general.
S. PULLORUM. Biochemical properties, **239**.
S. PULLORUM INFECTION [BACILLARY WHITE DIARRHOEA].
Control. Co-ordinated breeding and *pullorum*-control programme for the U.S.A.: the national poultry improvement plan, **973**; conference of laboratory workers in pullorum disease control, U.S.A., 1938, **825**; report on eradication of pullorum disease in Massachusetts, U.S.A., **495**.
Diagnosis. The agglutination test, **938**; comparison of tube and whole blood tests of turkeys, **689**.
See also *Salmonella* Group, general.
Immunity. Hereditary resistance and susceptibility to pullorum disease, **739**.
S. TYPHI. See *Salmonella* Group, antigens.
S. TYPHI-MURIUM. See *Salmonella* Group, general; *Salmonella* Infection, general, in ducks, in eggs.
SANDFLIES. See *Phlebotomus*.
SAPONIN. See Glucoside Vaccines.
SARCOMA. Lymphosarcoma in rats, **194**; influence of carcinogenic substances on sarcomata produced by the same and other compounds, **282**.
SARCOMA, FOWL. In budgerigars, **952**; protein content of serum of inoculated hens, **453**; neutralizing antibodies for Rous sarcoma virus in the sera of young "normal" chicks, **280**; immunological experiments with the Rous I tumour-producing agent, **609**; transmission of the Rous filterable agent to chemically induced tumours, **96**; experiments on the des Ligneris fowl sarcoma, **280**; chemical and immunological studies on the agent producing fowl sarcoma, **858**; properties of antisera produced by extracts of a non-filterable dibenzanthracene fowl sarcoma, **610**; a polysaccharide in tumours due to a virus of fowl sarcoma, **953**; X-ray resistance of the virus, **783**.
SCHISTOSOMA. In domesticated animals in India, **32**; *S. japonicum* in sheep and goats in China, **678**; the buffalo as host of *S. spindale* in Malaya, **32**; infestation of *Bulinus truncatus* with *S. bovis* in Tunisia, **261**; larval schistosomes in South African molluscs, **682**; variation in egg shape, **262**; sites of adult schistosomes in relation to their life-cycle, **262**.
SCHWANNOMA. See Neoplasms, general.
SCHWEINSBERG DISEASE. In horses, **947**.
SCLEROSIS. See Circulatory System, diseases.
SCLEROSTOMES. See Strongyles.
SCOTLAND. See Great Britain.
SCREWWORM. See Myiasis, general.
SCURVY. See Vitamins, vitamin C.
SEAGULLS. See *Salmonella* Infection [Paratyphoid], in eggs.
SELENIUM. In rocks, soils, and plants, **380**; in relation to public health, **213**; alkali disease or selenium poisoning, **296**; lethal dose of sodium selenite for horses, mules, cattle and swine, **964**; influence of diet on toxicity, **129, 963**; fate of selenium in the organism, **58, 622**; increasing rate of excretion from selenized animals by administration of *p*-bromobenzene, **710**.
SEMEN. See Insemination, Artificial.
SEMINOMA. Pathogenesis of seminoma of the testis: a histological study in dogs, **450**.
SENSITIZATION. See Allergy.
SERUM. See Blood, serum; Complement; Shock.
SERVICES, VETERINARY. The National Veterinary Service [United Kingom], **632**; veterinary work in the North-West Frontier Province, India, **804**; cost of veterinary sanitary inspection in France, **889**; work of French veterinarians in Morocco, **476**; native veterinarians in French West Africa, **805**; organization of general veterinary services in French colonies, **890**; meeting of the directors of the Animal Health Bureaux, Germany, 1939, **67**; organization and results of the poultry health service in Germany, **972**; veterinary service in Portugal, **218**; organization of the veterinary and livestock services of the Portuguese colonial empire, **971**; section for veterinary science, animal protection, animal insurance, and state veterinary service of the Swiss exhibition at Zurich, 1938, **971**; veterinary affairs in Iran, **971**.
See also Army Veterinary Work; Reports; Research, general; Research Institutes.
SESBANIA VESICARIA. See Poisoning, plants.
SEX HORMONES. See Hormones, sex hormones.
SHEEP.
Anatomy. See Skin, general; Thyroid Gland.
Arthropod Parasites. See Mange; Myiasis; Tick-Borne Fever; Ticks.
Bacterial Diseases. See Actinobacillosis; Bradsot; *Brucella* Infection; *Clostridium* Infection, General; *Listerella* Infection; *Mycobacterium johnei* Infection [Johne's Disease]; *Mycobacterium tuberculosis* Infection; *Pfeifferella mallei* Infection [Glanders], general; *Salmonella* Infection; *Staphylococcus* Infection, immunization.
Diseases, General. Causes of loss in sheep, **855**; diseases of bighorn in Rocky Mountain National Park, U.S.A., **273**.
See also Adenoma; Foot Rot; Liver, diseases; Pneumonia; Silicosis.
Fungous Disease. See Actinobacillosis.
Genital System. Diseases of breeding ewes, **900**.
See also Fertility; Oestrus; Pregnancy, diseases; Spermatozoa; Sterility.
Helminth Parasites. See Anthelmintics; Helminth Parasites, of sheep; Phenothiazine; Technique, helminthological.
Nutrition. See Abortion; Coast Disease; Eczema; Grass Tetany; Phosphorus, deficiency; Pine Disease; Swayback.
Physiology. See Blood, chemical composition, respiratory quotient; Brain; Digestive System, general; Rumen.
Poisoning. See Poisoning, cyanide, metals metalloids and salts plants.
Protozoan Diseases. See *Babesia* Infection [Piroplasmosis]; *Eimeria* Infection [Coccidiosis]; *Eperythrozoon* Infection; *Rickettsia* Infection; *Theileria* Infection; *Trypanosoma* Infection, in ruminants.
Virus Diseases. See Viruses, sheep viruses.
SHEEP SCAB. See Mange.
SHIGELLA EQUIRULIS. See *Bacterium equirulis*.
SHOCK. Concentrated serum in treatment of traumatic and histamine shock, **692**.
See also Histamine.
SHOCK DISEASE. In hares, **444, 692**.
SIERRA LEONE. Livestock diseases in, **152**.
See also Reports.
SILICOSIS. In lungs of sheep living in sandy regions of Morocco, **444**.
SIMULIUM. See *Danubosimulium*; *Leucocytozoon* Infection.
SKIN.
General. Chlorine content of the skin of domestic animals, **625**; cystine content of the skin and hair of domestic animals, **299**; estimation of follicle population per unit area of sheep skin, **886**; transmission of skin sensitization, **186**.
Diseases. Of elephants, **110**; salt intake in relation to cutaneous necrosis of camels in British Somaliland, **707**; a skin condition in Rhodesian ridgeback dogs, **778**; skin diseases occurring in both man and animals, **42**.
See also Dermatitis, contagious pustular; Eczema; *Habronema*; Microfilariae; Neoplasms, general; Oestridae, warbles; *Parafilaria*; Ringworm; *Staphylococcus* Infection, treatment.
SLAUGHTER. Stunning of slaughter animals, **789**; destruction of medulla oblongata, and influence on blood content of slaughter animals, **889**; apparatus for killing poultry, **803**.
See also Anaesthetics.
SLIPPED TENDON. See Perosis.
SNAKE BITE. In domestic animals in the U.S.A., **466**; in Yugoslavia, **379**.
SNAKE VENOM. Glutathionaemia in horses injected with, **601**.
See also *Clostridium* Infection, treatment.
SNOTSIEKTE. See Catarrh, Bovine Malignant.
SODIUM. See Blood, chemical composition.
SODIUM CHLORIDE. Absorption of water from salt solution in the large intestine of ruminants, **213**.
See also Arthritis; Oestridae, treatment; Poisoning, metals metalloids and salts; Skin, diseases.
SODIUM *o*-PHENYL PHENOLATE. See *Mycobacterium tuberculosis*, viability.
SOIL BACILLUS. See Bacteria General, bactericidal agents.

SONNE DYSENTERY. See Milk, diseases transmitted by.
SORGHUM. See Poisoning, cyanide.
SOUTH AFRICA. See Union of South Africa.
SOUTH AMERICA. See Encephalomyelitis Equine, general; Rabies, general; Psittacosis, and under names of component countries.
SOUTHERN RHODESIA. Livestock diseases in, **399**, **893**.
See also Reports; Research, general.
SPECTROGRAPHIC ANALYSIS. In Great Britain, **311**.
SPECTROPHOTOMETRY. Absorption spectrophotometry and its applications; bibliography and abstracts, 1932-38, **227**.
SPERMATOZOA. Effect of unilateral castration on spermatogenesis, **472**; chemistry and cytology of the sperm membrane of sheep, **881**.
SPINAL CORD. See Nervous System.
SPIRILLUM INFECTION. Role of the cat in transmission of *S. minus*, **664**; inoculation of *S. minus* into hens and into chick embryos, **754**.
SPIROCERCA. Differentiation from *Dirofilaria*, **525**.
SPIROCHAETA INFECTION.
General. Ulcerative spirochaetosis of pigs, **920**; *S. dromadis* n.sp. from the dromedary, **585**.
Avian, **87**; effect of two new arsenical compounds, **960**; virulence of cultures of *S. gallinarum* at the invisible stage, **835**.
SPIROCHAETAL JAUNDICE. See *Leptospira* Infection.
SPIROCHAETES. Evolution, **333**; prolonged maintenance in the frozen state, **631**.
See also *Leptospira*; *Treponema*.
SPLEEN. See Helminth Parasites, in dogs; *Leishmania* Infection, canine; *Leucocytozoon* Infection; Purpura.
SPRAINS. Treatment by procaine infiltration, **888**.
SPRAY RESIDUES. See Poisoning, metals metalloids and salts.
SPRAYS. See Repellents.
STAINING. Of metachromatic granules in animal pathogenic organisms, **393**; technique for demonstrating bacterial flagella, **473**; application of Le Masurier's method of staining macroscopic brain sections, **969**.
See also Bacteria General, viability; Brucella Infection, in milk; Mastitis, Bovine, general; *Mycobacterium*, general; *Rickettsia* Infection, general; Technique, helminthological; Viruses, cultivation, elementary bodies.
STANDARDIZATION OF BIOLOGICAL PRODUCTS. See Biological Products, standardization.
STAPHYLOCOCCUS.
General. Pathogenic staphylococci, **4**; characteristics of udder staphylococci in infectious bovine mastitis, **231**; agglutination by normal horse serum, **551**; proteolytic ferments of staphylococci and their pathogenic significance, **231**; rapid production of antiserum of antitoxic value, **527**; action of staphylococci on the development in culture of *Microsporon felineum*, **84**.
Haemolysis. Produced by staphylococcal colonies and toxin, **315**; a peculiar type of staphylococcal haemolysis, **157**; β haemolysin, **157**; γ haemolysin, **157**.
Toxins, **4**; nephritis in the dog produced by, **71**; the toxin-red-cell reaction, **4**; production of toxins with a view to obtaining the corresponding anatoxins, **600**; inactivation of toxins of *Staph. aureus* by sulphanilamide *in vitro*, **125**.
See also *Staphylococcus* Infection, general, immunization, treatment.
STAPHYLOCOCCUS INFECTION.
General. Food poisoning due to staphylococci, **551**; late paralyses in rabbits following infections, **573**.
See also Mastitis, Bovine.
Immunization. Of ewes against staphylococcal mastitis, **487**, **980**; effects of intraperitoneal injections of antitoxin on infection in mice, **437**.
Treatment. Action of sulphamide derivatives, **55**; anatoxin therapy, **38**; of cutaneous staphylococcosis of the dog, **316**.
See also Mastitis, Bovine, treatment.
STATISTICS. Text-books, **312**, **982**; veterinary statistics, **65**; problems of chance in medicine and research, **146**; marginal punch card for tabulating vital statistics data, **394**.
STERILITY.
General. In male domestic animals, **361**.
In Cattle. In cows, **107**; physiological aspects, **443**; of microbial origin, **443**.
See also *Brucella* Infection; Testicle, diseases; *Trichomonas* Infection.
Control. In cows with "Physex Leo" gonadotrophic hormone, **296**; by gonadotrophic hormones in the bitch, **463**; in silver foxes, **128**; effect of prolan upon fertility in the silver fox, **463**; methods of overcoming sterility in bison-yak hybrids, **443**.
See also Hormones, sex hormones; Insemination, Artificial.
In Horses. In mares, **191**, **361**, **944**.
In Sheep. Research on sterility in rams, **191**.
STERILIZATION. Of syringes and needles, **804**, **886**; hot air sterilization in bacteriological laboratories, **718**.
See also Disinfectants; Formaldehyde.
STIFF LAMB DISEASE. In Michigan, U.S.A., **109**; the stiff lamb problem, with special reference to white muscle disease, **188**.
STILBOESTROL. See Hormones, sex hormones.
STOMACH.
General. Problems of gastric secretion, **60**; primary acidity of the gastric juice, **627**; the fore stomach of ruminants, **136**; effects of drugs on the ruminant's stomach, **802**.
See also Digestive System, general; Rumen.
Diseases. Linitis plastica in the dog, **535**.
See also Adenoma; Vitamins, vitamin A.
STOMACH WORMS. The swine sanitation system of controlling swine stomach worms in the U.S.A., **523**.
See also *Haemonchus*; *Hyostrongylus*.
STOMATITIS, VESICULAR. Propagation of the virus in the chick embryo, **172**.
STRAITS SETTLEMENTS. See Malaya.
STRANGLES. See *Streptococcus equi* Infection.
STREPTOCOCCAL MASTITIS. See Mastitis, Bovine.
STREPTOCOCCUS.
General. Streptococci of bovine mastitis, **817**; serological types of group B streptococci (*Str. agalactiae*) from herds in New South Wales, Australia, **731**; antibodies in the sera of cows with group B streptococci, **488**; group similarity of *a*-haemolytic bovine mastitis streptococci for group C, **2**; antigenic structure of haemolytic streptococci of group A, **313**; Lancefield's method of classifying, **407**; group specific substances and biochemical characteristics of haemolytic streptococci, **903**; comparison of equine and human haemolytic streptococci, **731**; characteristics of human and animal strains of groups A and C, **231**.
See also Arthritis; Mastitis, Bovine.
Cultivation. Reactions in blood agar, **314**; simple confirmatory medium for *Str. agalactiae*, **1**; selective cultivation of *Str. agalactiae* and *Br. abortus* in the incubating egg, **630**, **968**; growth factors for haemolytic streptococci, **314**; glutamine and the growth of *Str. haemolyticus*, **157**.
Lysins. Of various haemolytic streptococci, **817**; antigenic properties, **817**; serological varieties of streptolysin, O and S, **817**; a stable haemolysin-leucocidin and its crystalline derivative from β haemolytic streptococci, **313**.
Toxins. Of haemolytic streptococci, **3**; lethal toxins and their antibodies, **817**; toxic extracts in animal serum, **4**.
STREPTOCOCCUS INFECTION.
General. Spread by carriers, **407**; aerial spread, **407**; epidemic in a controlled g. pig colony, **315**; induced localization through calcium gluconate injections, **488**.
In Cattle. Diplostreptococcal sepsis of calves, **69**.
See also Mastitis, bovine; *Streptococcus*, general.
In Horses. Streptococcal pneumonia of foals as a complication of nuttalliasis, **442**.
See also *Streptococcus*, general; *Streptococcus equi* Infection [Strangles].
In Milk. See Milk, bacterial content.
Treatment. With sulphanilamides, **56**, **618**, **777**; sulphanilamide therapy in the horse, **872**; with sulphanilamide and serum, **209**, **703**; with prontosil, **705**, **957**; mode of action of sulphanilamide in streptococcal empyema, **461**.
See also Antivirus; Mastitis, Bovine, treatment; Sulphamide Compounds, therapy.
STR. AGALACTIAE [MASTITIDIS]. Virulence from clinically normal udders, **69**; cultural and clinical significance of non-haemolytic streptococci that ferment aesculin, **2**.
See also Mastitis, Bovine, diagnosis; *Streptococcus*.
STR. EQUI INFECTION [STRANGLES]. Aetiology of virulent strangles in foals, **2**; secondary infections in strangles, **2**; culture medium for isolation of *Str. equi* from strangles materials, **393**; colony type of *Str. equi*, **3**.
STRIKE, BLOWFLY. See Myiasis.
STRONGYLES. In apparently healthy cattle in Queensland, Australia, **31**; in Philippine horses, **683**; role of pastures in development of strongylosis of grazing animals, **264**; diagnosis in ruminants, **348**; differential diagnosis in horses, **430**; diagnosis of red-worm disease in horses by means of egg counts, **596**; treatment of equine strongylosis, **684**, **935**; copper-arsenic therapy of calves, **962**.
See also *Ancylostoma*; Lungworms; Nematodes, general; *Oesophagostomum*; *Syngamus*; Technique, helminthological; Trichostrongyles; *Uncinaria*.
STRONGYLOIDES. In cattle, **348**; *S. papillosus* from sheep, **598**; natural infection in a dog, **100**; life-cycle, **183**; specificity and plurality of *Strongyloides*, **526**; chemotherapy in rats, **378**.

STRONGYLUS. Migration of the larvae of *S. equinus* in the animal body, **348** ; egg production of *S. equinus* and *S. vulgaris*, **349** ; studies on *S. vulgaris*, I, II, III, **684**.
STUTTGART DISEASE. See *Leptospira* Infection.
SUBULURA. Life-history of *S. brumpti*, a cæcal nematode of poultry in Hawaii, **34**.
SUCKLEYA SUCKLEYANA. See Poisoning, plants.
SUDAN. Livestock diseases in, **399**.
See also Reports.
SUGAR BEET. See Poisoning, plants.
SUGAR. BLOOD. See Blood, chemical composition.
SUGAR PRIVATION. See *Trypanosoma* Infection, treatment.
SULFAPYRIDINE. See Sulphamide Compounds.
SULPHAMIDE COMPOUNDS.
General. Dose rates and blood concentration in horses, **791** ; estimation in blood and urine, **375** ; reaction of the cow to sulphanilamide, **702** ; fate in the body of sulphapyridine, **704** ; acetylation of sulphanilamide and sulphapyridine in the cat, **792**; culture of human marrow in the evaluation of sulphanilamide and related compounds, **124**.
Mode of Action, 873 ; of sulphanilamide, **210**, **461**, **704**, **705**, **790**, **872** ; of prontosil, **552**, **705** ; effect of sulfapyridine on phagocytosis and dissociation, **704**.
See also Bacteriophage.
Therapy. Of infectious diseases, **292** ; of bacterial infections, **210**, **293** ; bacteriostatic action of sulphanilamide and M. & B. 693, **618** ; chemotherapy of bacterial diseases by the *p*-aminosulphonamide group, **292** ; by *p*-amino-benzene-sulphonamide, **462** ; prontosil in the diseases of small animals, **374** ; local treatment with prontosil soluble, **703** ; M. & B. 693 in the treatment of swine diseases, **357** ; some new derivatives active against bacterial infections, **552**.
See also Anaemia, Equine Infectious, treatment ; Arthritis ; *Bacillus anthracis* Infection, treatment ; *Brucella* Infection treatment ; *Clostridium* General, toxins ; *Clostridium* Infection, General, treatment ; *Clostridium tetani* Infection ; *Eimeria* Infection [Coccidiosis], treatment ; *Erysipelothrix* Infection ; *Fusiformis necrophorus* Infection ; Gastro-Enteritis, Feline Infectious ; *Listerella* Infection ; Mastitis, Bovine, treatment ; *Mycobacterium tuberculosis* Infection, treatment ; *Paragonimus* ; *Pasteurella* Infection, treatment ; Peritonitis ; Pneumonia ; Rabies, treatment ; *Staphylococcus*, toxins ; *Staphylococcus* Infection, treatment ; *Streptococcus* Infection, treatment.
Toxicity. Of sulphanilamide and benzylsulphanilamide, **873** ; comparison of porphyrinuric action of sulphonamide drugs with reported toxicity, therapeutic efficiency, and causation of methaemoglobinaemia, **374** ; placental transmission of sulphanilamide and effects upon the foetus and newborn, **552** ; cyanosis in chickens and mice induced by sulphanilamide, **879** ; toxic effect of sulphanilamide and sulphanilyl sulphanilamide ("disulphanilamide") to rabbits and chickens, **553** ; histopathological changes, **553**.
SULPHANILAMIDE. See Sulphamide Compounds.
SULPHONE. See *Mycobacterium tuberculosis* Infection, treatment.
SULPHUR. See *Eimeria* Infection [Coccidiosis], treatment; Neoplasms, causation ; Poisoning, metals metalloids and salts ; Urine.
"SUMMER SORES" IN HORSES. See *Habronema*.
SURFEN C. See *Trypanosoma* Infection, treatment.
SURINAM. See Dutch Guiana.
SURRA. See *Trypanosoma evansi* Infection.
SWAYBACK. In lambs, **109** ; in Derbyshire, **698** ; feeding of copper to pregnant ewes in the control of "swayback" in Derbyshire, **612**.
SWEDEN. Livestock diseases in, **152**, **645**.
See also Anaemia, Equine Infectious ; *Bacterium tularense* Infection [Tularaemia] ; Food Inspection, general ; Foot and Mouth Disease, control ; Reports.
SWINE.
General. Fertility, mortality and growth rate, **856**.
See also Piglets.
Anatomy. See Liver.
Bacterial Diseases. See *Bacillus anthracis* Infection, transmission ; *Brucella* Infection ; *Erysipelothrix rhusiopathiae* Infection ; *Mycobacterium tuberculosis* Infection, meat inspection, in swine ; *Pasteurella* Infection ; *Salmonella* Infection ; *Salmonella cholerae-suis*.
Diseases General. In Western Canada, **188** ; control on a pig farm, **357** ; results of autopsies during 1928-38 at the Zagreb Veterinary College, Yugoslavia, **772** ; a new infectious disease, **691** ; a condition of unknown aetiology in Australia, **947**; lameness, **784** ; unusual changes in the fatty tissues, **778**.
See also Adenoma ; Arthritis ; Bronchopneumonia ; Digestive System, diseases ; Fat Necrosis ; Leucosis, general ; Nervous System, diseases ; Respiratory System, diseases ; Sulphamide Compounds, therapy.
Genital System. See Congenital Defects ; Hormones, sex hormones ; Metabolism, diseases.
Helminth Parasites. See Helminth Parasites, of swine.
Nutrition. See Blood, chemical composition ; Iron, deficiency ; Nutrition, general ; Phosphorus ; Vitamins.
Physiology. See Blood, haemoglobin, picture ; Complement ; Digestive System, general.
Poisoning. See Carbon Tetrachloride, poisoning ; Cod Liver Oil, toxicity ; Poisoning, cyanide, metals metalloids and salts ; Selenium.
Protozoan Diseases. See *Balantidium* Infection ; *Spirochaeta* Infection ; *Trypanosoma* Infection.
Virus Diseases. See Viruses, swine viruses.
SWINE DYSENTERY. See Dysentery, of swine.
SWINE ERYSIPELAS. See *Erysipelothrix rhusiopathiae* Infection.
SWINE FEVER.
General, 587 ; in South Africa, **940** ; in East Africa, **942** ; in the U.S.A., **899** ; report of the committee on hog cholera [Philippine Veterinary Medical Association], **89** ; intradermal diagnosis, **980** ; chemical changes in the blood of infected swine, **175** ; frequency of occurrence of lesions in hog cholera, **90** ; transmissibility to other species of animals, **335**, **337** ; by lice, **421**.
Immunization. With crystal-violet vaccine, **90**, **513**, **839**, **898** ; with avirulent organ emulsions, **839** ; Terakado's method, **839** ; of unweaned pigs by virus and serum-virus inoculation, **513** ; of suckling pigs from immune sows with virus only, **760** ; congenital swine fever in piglets born of sows given serum and virus, **514** ; intensity of immunity following large doses of virus in simultaneous inoculation, **254** ; anaerobic infection after injection of formol vaccine, **91** ; preparation of swine fever serum at the Pasteur Institute, Nhatrang, Indochina, **759**.
Virus, 335 ; resistance to physical agencies and chemical disinfectants, **838** ; effects of heat on phenolized virus, **760** ; work of the swine fever research institute, Eystrup-on-the-Weser, Germany, **175**.
SWINE INFLUENZA. See Influenza, swine.
SWINE PLAGUE. See *Pasteurella* Infection, in swine.
SWITZERLAND. See *Balantidium* Infection ; Exhibitions ; Filariae ; Food Inspection, general ; Foot and Mouth Disease, general ; Mastitis, Bovine, control ; Services, Veterinary ; Vivisection.
SYNGAMUS, 849 ; gapeworm in Indian poultry, **849** ; causal relationship of larval migration of *S. trachea* to pneumonia in young birds, **34** ; flies as intermediate hosts, **100**.
SYNTHALIN. See *Trypanosoma* General, drug resistance ; *Trypanosoma* Infection, treatment.
SYNTHETOCAULUS. In sheep in the USSR, **685**.
SYRINGES. See Apparatus ; Sterilization.

T

TABANUS. See *Bacillus anthracis* Infection, transmission.
TAENIA. Transmission of *T. ovis* to a dog, **846** ; toxicity of extracts of, **264** ; a new anthelmintic "raigan" for taeniasis, **58** ; morphological and biological observations on taeniid cestodes, **99**.
See also *Cysticercus* ; Helminth Parasites, diagnosis.
TANGANYIKA. See *Mycobacterium tuberculosis* Infection, in cattle.
TEART PASTURES. See Diarrhoea.
"TEBECIT". See *Mycobacterium tuberculosis*, viability.
TECHNIQUE.
General. Aseptic removal of chick embryo from egg, **630** ; a collodion sac for animal experiments, **474** ; solid carbon dioxide in preparation of gross pathologic specimens, **563** ; experimental technique for studying the alimentary tract of sheep, **967**.
See also Apparatus ; Blood, chemical composition, sedimentation rate, transfusion ; Books, biochemistry, technique ; Centrifugation ; Filtration ; Media ; Microscopy ; Spectrophotometry ; Sterilization ; Urine.
Bacteriological. Ball mills, **394**, **803** ; sampling errors in the determination of bacterial density by the dilution method, **920** ; direct enumeration of micro-organisms in bacterial suspensions, **717** ; isolation of bacteria from virus and phage by a serial dilution method, **519** ; apparatus for surface culture of anaerobes and tubercle bacilli, **63** ; supplying carbon dioxide to culture tubes, **718**.
See also Books, bacteriology ; Embryos, fowl ; Staining ; Sterilization ; Udder ; and under name of specific organism and method.
Helminthological. Estimation of pasture infestation by strongyloid larvae, **769** ; collection of nematode larvae from faeces, **594** ;

TECHNIQUE—Helminthological [cont'd].
counting nematode eggs in sheep faeces, **217**; buffered solutions in staining helminths, **301**.
See also under name of helminth.
Histological. Flattening out paraffin sections, **630**; nitrocellulose in amyl acetate as an embedding medium, **563**; mounting media superior to Canada balsam, **144**; preparing lantern slides of histologic specimens in two colours, **564**; the polarized light method for the study of myelin degeneration, **393**.
See also Rickets; Skin, general; Staining.
TEETH. Development and structure of molar teeth in donkeys and horses, **647**.
See also Calcium, metabolism.
TEMPERATURE. Influence of atmospheric temperature on the body temperature of cattle, **298**; variability of the body temperature in normal chicks, **466**.
See also *Brucella* Infection, general; Myiasis; *Trypanosoma* Infection, immunity.
TESCHIN DISEASE. See Encephalomyelitis, porcine.
TESTICLE.
Diseases. Pathological changes in the testicles of impotent bulls, **450**.
See also Congenital Defects; Neoplasms, general; Seminoma.
TESTOSTERONE. See Hormones, sex hormones.
TETANUS. See *Clostridium tetani* Infection.
TETANY. Transit tetany in ponies, **611**.
See also Grass Tetany.
TETRACHLORETHYLENE. See Anthelmintics.
TEXT-BOOKS. See Books.
THEILERIA INFECTION.
General. In sheep in Asia Minor, **248**; clinical differentiation of piroplasmosis and theileriasis in cattle, **331**; cross-immunity between Iranian and Algerian bovine theileria, **415**; immunization by inoculation of infected blood or by the bites of infected ticks, **415**; causative agents of cattle piroplasmosis in the USSR, **502**; new vectors, **344**; East Coast fever in Kenya, **941**; in South Africa, **941**; in an eland, **416**; coproporphyrin excretion in E.C.F. of cattle, **752**; development and pathogenicity of *T. parva*, **502**.
Control. By pasture rotation, **753**; importance of byre hygiene, **332**.
Treatment. Effect of arsenical solutions on theileriasis and on vector ticks in Central Asia, **620**; antimosan therapy, **620**; treatment with piroplasmin, **377**; acaprin treatment of East Coast fever, **126**.
THERAPEUTICS.
General. Recent advances in therapeutic agents for veterinary use, **617**; text-book, **646**; survey of laws about the sale of remedies for animal diseases, **721**; the therapeutic substances amendment regulations, Great Britain, 1939, **889**.
See also Adrenalin; Anaphylaxis; Calcium; Hormones; Insecticides; Iron; Minerals, metabolism; Pituitary Gland; Repellents; Reports, Australia; Stomach, general; Sulphamide Compounds, therapy; Vaccines; Vitamins.
Of Bacterial Diseases. Chemotherapy of bacterial diseases, **210**.
See also Acridine; Entozon; Fouadin; Rivanol; Sulphamide Compounds; Trypaflavine; and under specific disease.
Of Helminth Parasites. See Anthelmintics; Phenothiazine; and under name of helminth.
Of Protozoan Diseases. See Acaprin; Antimosan; Arsenic; Arsenobenzene; Arsinic Acids; Germanin (Bayer 205); Naganol; Quinoline; Surfen C; Synthalin; Undecane Diamidine; X-Rays; and under name of specific disease.
Of Virus Diseases. See Mercurochrome; Novarsenol; and under name of specific disease.
THIAMIN HYDROCHLORIDE. See Vitamins, vitamin B_1.
THORAX. Anatomy in the elephant, **361**; in calves, **624**; in cattle, **559**.
THREE DAY SICKNESS IN CATTLE, 605.
THYMUS GLAND. Of cattle affected with pica, **285**.
See also Neoplasms, general, endocrine system in relation to; Rinderpest, immunization.
THYROID GLAND. Peculiarities of the sheep thyroid, **856**; influence of ingested radioactive materials upon the thyroid gland of rats, **212**.
See also Pituitary Gland, thyrotrophic hormone.
TICK FEVER. Immunization of cattle in Queensland, Australia, **567**, **751**.
See also *Anaplasma* Infection; *Babesia* Infection [Piroplasmosis].
TICK PARALYSIS. See Paralysis, tick.
TICK-BORNE FEVER. In sheep in Norway, **679**.
See also Ticks, diseases transmitted by.
TICKS.
General. Of East Africa, **679**; of Yugoslavia, **344**; of domestic animals in Britain, **179**; of dogs in Florida, U.S.A., **98**; of cattle in Manchukuo, **679**; damage to hides caused by cattle ticks in India, **923**; Ixodidae of Guadeloupe, **259**; *Dermacentor* and *Otocentor* (Ixodidae) in the U.S.A. with studies in variation, **30**; the Gulf Coast tick in the U.S.A., **97**; *Ixodes ricinus* in Great Britain, **179**, **844**; in Uruguay, **179**; larvae of the dog tick, *Rhipicephalus sanguineus*, **591**; *Haemaphysalis* in the USSR, **429**; *Hyalomma* under sandy desert conditions, **680**; problem of acquired immunity to argasid ticks, **592**.
See also Arthropod Parasites.
Control. Recent methods of tick eradication, **767**; in the U.S.A., **899**; of the dog tick *Dermacentor variabilis*, **428**; deer in relation to fever tick eradication in Florida, U.S.A., **428**; control of sheep ticks, **520**, **766**; in Great Britain, **260**, **520**; report of the North East of Scotland Sheep Tick Committee, **29**; effect of arsenical solutions on *Hyalomma* and *Boophilus* in Central Asia, **620**.
Diseases Caused and Transmitted By. Ticks as vectors of animal diseases, **428**; tick-borne protozoan diseases in South Africa, **498**; ticks and tick-borne diseases of East Africa, **427**.
See also *Aegyptianella pullorum* Infection; *Anaplasma* Infection; *Babesia* Infection [Piroplasmosis]; *Bacterium tularense* Infection [Tularaemia]; Encephalomyelitis, equine; Louping Ill; Nairobi Sheep Disease; Paralysis, tick; *Rickettsia* Infection; *Theileria* Infection; Tick-Borne Fever.
TILLETIA. See Poisoning, general.
TISSUE CULTURE. Culture of human marrow in the evaluation of therapeutic agents, **124**.
See also *Leishmania*.
TOADS. See Poisoning, general.
TOBACCO LICKS. See Trichostrongyles.
TOCOPHEROLS. See Vitamins, vitamin E.
TOXAEMIA. Pregnancy toxaemia in ewes, **276**, **539**; blood plasma changes and variations in the female bovine toxaemias, **46**.
TOXINS. See Bacteria General, toxins; *Clostridium* General, toxins; Helminth Parasites, toxins; *Staphylococcus*, toxins; *Streptococcus*, toxins.
TOXOCARA. See Anthelmintics.
TOXOPLASMA INFECTION. In raccoon dogs near Sapporo, Japan, **417**; *T. gallinarum* n. sp. in the retina of the fowl and its connexion with fowl paralysis, **417**; complement-fixation reaction, **332**; identity of toxoplasms of animal and human origin, **663**.
TRACE ELEMENTS. In nutrition and disease, **539**, **861**; importance in biology, **196**.
TRANSFUSION, BLOOD. See Blood, transfusion.
TRANSIT FEVER. Differences in clinical picture of transit fever and haemorrhagic septicaemia, **604**.
TRANSIT TETANY. See Tetany.
TRAPS. See *Glossina*; *Lyperosia*; Myiasis.
TREMATODES, GENERAL. In Tunisia, **261**; of buffaloes in Canton slaughter houses, **429**; of domesticated animals in Burma, **98**; larval Trematoda of South African Mollusca, **682**; biology and pathogenic significance of trematodes, **261**.
See also *Brachylaemus*; *Clonorchis*; *Cotylurus*; *Dicrocoelium*; *Fasciola*; Helminth Parasites, general; *Paragonimus*; Paramphistomes; *Paramphistomum*; *Schistosoma*.
TREPONEMA. Infection of the fowl embryo with *T. duttoni*, **419**; viability in defibrinated blood at ordinary temperatures, **244**.
TRIATOMA. See *Trypanosoma cruzi* Infection [Chagas' Disease].
TRIBULUS TERRESTRIS. See Poisoning, plants.
TRICHINELLA INFECTION.
General. *T. spiralis* in man, dogs and cats in the New Orleans area, U.S.A., **184**; in foxes, **352**; effect of heat on the larvae, **686**; minimum dose of larvae producing muscle infestation in g. pigs: productiveness of the female worm, **523**, **598**; behaviour of larvae in the heart, **523**; migration of larvae in striped muscle fibres, **523**; studies on trichinosis, VIII. The antigenic phase, **850**; skin reaction to *Trichinella* antigens in healthy and *Ascaris*-infected swine, **352**.
Diagnosis. By Stäubli's method, **431**; by intracutaneous tests in swine, **352**; by serological methods [precipitation], **102**.
Immunity. After feeding metabolic products of encysted trichinae, **351**; conditions of immunity, **524**; present state of our knowledge on immunobiology of trichinosis, **351**.
Treatment. With butolan, **553**.
TRICHOMONAS, GENERAL.
General. Morphology of *T. columbae*, **501**; studies on trichomonads in the reproductive organs of cattle, I-V, **85**.
Cultivation. Of *T. foetus* in the chick embryo, **168**; of bovine trichomonads on protein-weak media, **168**; bacteria-free cultures of *T. hominis*, **585**; of *T. gallinarum*, intestinal flagellate of turkeys, **168**.
TRICHOMONAS INFECTION.
In Birds. In pigeons, **40**; in fowls, **168**; effect of caecectomy of

TRICHOMONAS INFECTION [cont'd].
chicks on their infectibility with *Trichomonas*, **330** ; a pathogenic *Trichomonas* from the upper digestive tract of chickens, **168**.
In Cattle, 330, 777, 980 ; in Rumania, **167** ; associated sterility in cattle in Slovenia, Yugoslavia, **277** ; control, **167** ; experimental transmission, **661** ; treatment of infected bulls, **167**.
TRICHONEMA. In horses in Holland, **479**.
See also Strongyles.
TRICHOPHYTON. See Ringworm.
TRICHOSTRONGYLES. In equines, **597** ; in sheep and goats, **33** ; course of infestation in sheep, **685** ; effect of tobacco licks on trichostrongylosis in sheep, **127**.
See also *Haemonchus* ; *Hyostrongylus* ; *Nematodirus* ; *Ornithostrongylus*.
TRICHOSTRONGYLUS. In sheep and goats, **33** ; hares and rabbits as hosts of sheep and goat bankrupt worms in South Africa, **768** ; human infection with *T. colubriformis* in New South Wales, **100** ; anthelmintic efficiency of phenothiazine in sheep, **876**.
TRICHURIS. In dogs, **353** ; shell structure and egg resistance of *T. trichiura*, **267**.
TRIFOLIUM HYBRIDUM. See Glossitis.
TRINIDAD AND TOBAGO. Livestock diseases in, **725**.
See also Reports.
TRYPAFLAVINE. See Mastitis, Bovine, treatment.
TRYPANBLUE. See Rinderpest, virus ; Viruses, cultivation.
TRYPANOSOMA GENERAL.
General. Morphological and taxonomic studies on mammalian trypanosomes, VI, **244** ; studies in trypanosomiasis, III. The electric charge of trypanosomes in the salivary glands of tsetse flies, **413** ; ablastic and trypanocidal antibodies against *T. duttoni*, **85** ; respiratory metabolism of *T. rhodesiense*, **500** ; photosensitivity induced in trypanosomes by acriflavine, **462**.
Cultivation. In the developing chick embryo, **413, 969** ; culture of *T. gambiense* in blood from normal and infected persons, **749** ; culture *in vitro* of an old strain of *T. gambiense*, **329**.
Drug Resistance. Preparation of strains of trypanosomes resistant to synthalin and undecane diamidine, and an analysis of their characters, **57**.
Viability. In defibrinated blood at ordinary temperatures, **244** ; of *T. cruzi*, *T. congolense*, and *T. equinum* in the organs after death of the host, **245** ; *in vitro* diathermy, by short and ultra-short waves, of *T. gambiense*, **749** ; effect of X-rays on trypanosomes, **749** ; behaviour of trypanosomes towards ultra-violet rays in a fluorescent medium, **94**.
TRYPANOSOMA INFECTION, GENERAL.
General. In South Africa, **941** ; *T. vivax* from Ruanda, Belgian Congo, **660** ; *T. congolense* infection in dogs on the Cameroon coast, **84** ; *T. rhodesiense* infection in the hen, **414** ; red blood corpuscle sedimentation rate in infected g. pigs, **415** ; attenuation of *T. annamense* after passage through an animal treated with antimony, **917**.
In Cattle. *T. viennei* in cattle in Surinam, **329, 660** ; *T. congolense* at Reinguira, Angola, **916**.
See also *T. evansi* Infection [Surra].
Diagnosis. Specificity of the formol reaction in camels, **917** ; staining of lymph node juice, **166** ; examination of the blood and bone-marrow for *T. brucei*, **166** ; blood culture as a method of diagnosis, **245**.
See also *T. equiperdum* Infection [Dourine].
In Horses. See Trypanosoma Infection, treatment ; *T. equinum* Infection [Mal de Caderas] ; *T. equiperdum* Infection [Dourine] ; *T. hippicum* Infection [Murrina].
Immunity. Influence of cold on *T. brucei* infection, **329** ; placental transmission of immunity against *T. duttoni* in mice, **584** ; against *T. cruzi* in rats, **167** ; relationship of mononuclear response to resistance, **414** ; studies on age resistance against trypanosome infections. V. Influence of age on *T. cruzi* infection **166** ; —. VI. Production of ablastin in rats of different ages infected with *T. lewisi*. VII. Influence of age on immunological response of rats to *T. cruzi* infection, **830**.
Immunization, 828 ; vaccination against *T. brucei* infection in g. pigs with infected chick embryo, **500**.
In Man, 85 ; sleeping sickness, **166** ; *T. gambiense* in the bone-marrow in untreated or uncured cases, **829** ; infectivity to man of *T. rhodesiense*, **84, 245**.
In Mules. See *T. hippicum* Infection [Murrina].
In Ruminants. *T. rhodesiense* infections in sheep and in antelopes, **244** ; spontaneous disappearance of *T. vivax* from the blood of ruminants during the course of fatal infection, **660**.
See also Trypanosoma Infection, in cattle.
In Swine. *T. simiae-suis* in the Belgian Congo, **750**.
Transmission. Of *T. gambiense* through monkeys, **413**.
See also *Glossina* ; *T. cruzi* Infection [Chagas' Disease].
Treatment, 959 ; of *T. pecaudi* infection in donkeys, **57** ; of *T. brucei* infection in horses with antimosan, naganol and antrypol, **707** ; of *T. congolense* and *T. vivax* infection of horses and cattle with congasin (Hoechst 6678, surfen C), **377** ; of *T. congolense* infection with surfen C, **707, 941** ; action of Baver 205, **792** ; of arsenobenzene, **793** ; of tryparsamide, **463** ; British research on synthalin (decamethylene diguanidine) for prevention and cure, **874** ; treatment by sugar privation, **294** ; trypanocidal action of atebrin in relation to its absorption by trypanosomes, **462** ; trypanocidal activity of the cerebrospinal fluid after administration of arsenic compounds, **56**.
See also Arsinic acids ; *T. equinum* Infection [Mal de Caderas]
T. ANNAMENSE. See *Trypanosoma* Infection, general.
T. BRUCEI. See *Trypanosoma* Infection, diagnosis, immunization, treatment.
T. CONGOLENSE. See *Trypanosoma* Infection, general, treatment.
T. CRUZI INFECTION [CHAGAS' DISEASE]. In Panama, **942** ; natural infection of *Triatoma gerstakeri* in Texas, **85** ; of *T. heidemanni* in Texas, **830** ; identification by the precipitin test of blood ingested by Reduviidae, **601** ; seasonal variations in experimental infection in young rats, **584**.
See also *Trypanosoma* General, viability ; *Trypanosoma* Infection, immunity.
T. DUTTONI. See *Trypanosoma* General, general ; *Trypanosoma* Infection, immunity.
T. EQUINUM INFECTION [MAL DE CADERAS]. In Venezuela (syn. derrengadera), **57**.
See also *Trypanosoma* General, viability.
T. EQUIPERDUM INFECTION [DOURINE].
General. In South Africa, **414** ; infection of horses with *T. equiperdum* maintained in g. pigs, **330** ; a method of preserving *T. equiperdum*, **969**.
Diagnosis, 18 ; rapid diagnosis, **500**.
Immunity. Chemico-biological immunization of white rats, **749** ; effect of splenectomy and blockade on the protective titre of antiserum, **829**.
T. EVANSI INFECTION [SURRA]. In Hyderabad State, India, **584** ; a trypanosome of the *evansi* group in a horse in Brazzaville, French Equatorial Africa, **584** ; naganol treatment, **619, 706** ; control of bovine surra with reference to possible vectors, **165** ; susceptibility to anthrax of g. pigs with surra, **575** ; behaviour of *T. evansi* in tsetse-flies with reference to its phylogeny, **750** ; absence of the kinetoplast in, **244**.
T. GAMBIENSE. See *Trypanosoma* General, cultivation, viability ; *Trypanosoma* Infection, in man, transmission.
T. HIPPICUM INFECTION [MURRINA]. Of horses and mules in Panama, **942**.
T. LEWISI. See *Trypanosoma* Infection, immunity.
T. PECAUDI. See *Trypanosoma* Infection, treatment.
T. RHODESIENSE. See *Trypanosoma* General, general ; *Trypanosoma* Infection, general, in man, in ruminants, treatment.
T. SIMIAE. See *Trypanosoma* Infection, in swine.
T. VIENNEI. See *Trypanosoma* Infection, in cattle.
T. VIVAX. See *Trypanosoma* Infection, general, in cattle, in ruminants, treatment.
TRYPARSAMIDE. See *Trypanosoma* Infection, treatment.
TSETSE FLIES. See Glossina.
TUBERCULIN. See *Mycobacterium*, general ; *Mycobact. tuberculosis*, tuberculin ; *Mycobact. tuberculosis*, tuberculin test.
TUBERCULOSIS. See *Mycobacterium tuberculosis* Infection.
TULARAEMIA. See *Bacterium tularense* Infection.
TUMOURS. See Neoplasms.
TUNISIA. Livestock diseases in, **896**.
See also Army Veterinary Work ; Reports ; Trematodes, general.
TURKEY. See *Bacterium tularense* Infection [Tularaemia] ; *Brucella* Infection, in milk ; *Mycobacterium tuberculosis* Infection, in milk ; *Theileria* Infection.
TURKEYS. Control of turkey diseases, **189**.
See also Aujeszky's Disease ; Bones, diseases ; *Capillaria* ; Fowl Paralysis ; *Histomonas meleagridis* Infection [Blackhead] ; *Leucocytozoon* ; Pox, in birds ; *Salmonella pullorum* Infection [Bacillary White Diarrhoea] ; *Trichomonas* General, cultivation
TURNING SICKNESS. Composition of the cerebrospinal fluid in the bovine with "turning sickness", **713**.
TYMPANITES. Bloat in dairy cattle, **854**.
TYPHLOHEPATITIS. See *Histomonas meleagridis* Infection [Blackhead].
TYPHUS FEVER. Methods of transmitting to swine, **920**.

U

UDDER. Nature of the swelling in the cow's udder at calving time, **140** ; blind quarters following injury or infection in udders of heifers, **605**.

UDDER [cont'd].
See also Mammary Gland; Mastitis, bovine; Milk, bacterial content; *Mycobacterium tuberculosis* Infection, in goats; Neoplasms, general; *Pasteurella* Infection, in cattle; Pox, in cattle; *Staphylococcus*, general; *Streptococcus agalactiae*.
UGANDA. Livestock diseases in, **401**.
See also Minerals, deficiency; *Mycobacterium tuberculosis* Infection, bovine type, in goats, in sheep; Reports.
ULERON. See *Rickettsia* Infection.
ULTRA-VIOLET RAYS. Behaviour of trypanosomes, bacteria, enzymes, bacteriophage and vaccinia elementary bodies towards ultra-violet rays in a fluorescent medium, **94**.
See also Bacteria General, bactericidal agents; Fluorescence.
UNCINARIA. See Anthelmintics.
UNDECANE DIAMIDINE. See *Trypanosoma* General, drug resistance.
UNDULANT FEVER. See *Brucella* Infection, in man.
UNION OF SOCIALIST SOVIET REPUBLICS. See *Anaplasma* Infection; *Babesia* Infection [Piroplasmosis], in cattle, in goats; *Bacterium coli* Infection; Bradsot; *Brucella* Infection, in sheep; Education; *Eimeria* Infection [Coccidiosis], general, in pheasants; *Erysipelothrix rhusiopathiae* Infection, general; Pleuropneumonia, treatment; Poisoning, plants; Research Institutes; *Synthetocaulus*; *Theileria* Infection; Ticks.
UNION OF SOUTH AFRICA. Tropical and subtropical diseases in, **940**.
See also *Bacillus anthracis* Infection, control; Blue Tongue; Breeding; *Eperythrozoon* Infection; Horse-Sickness, African; *Lyperosia*; *Mycobacterium tuberculosis* Infection, in cattle; *Nematodirus*; Nutrition, general, diseases in relation to; Pleuropneumonia, bovine contagious; Poisoning, plants; Rabies, transmission; Reports; *Rickettsia* Infection; *Schistosoma*; Swine Fever, general; *Theileria* Infection; Ticks, diseases transmitted by; Trematodes, general; *Trichostrongylus*; *Trypanosoma* Infection, general; *Trypanosoma equiperdum* Infection [Dourine].
UNITED STATES OF AMERICA. Livestock diseases in California, **814**.
See also *Ancylostoma*; Arthropod Parasites; Aujeszky's Disease, in swine; *Bacillus anthracis* Infection, in mink; Breeding; *Brucella* Infection, general, control, immunization; *Clostridium* Infection, general; Committees; Conferences; *Dirofilaria*; *Echinococcus*; Education; *Eimeria* Infection [Coccidiosis], in pheasants; Encephalomyelitis, Equine; Fowls, diseases general; *Leucocytozoon* Infection; Mange; Mastitis, Bovine; Milk, diseases transmitted by, hygiene; Milk Fever; *Mycobacterium johnei* Infection [Johne's Disease]; *Mycobacterium tuberculosis*, control, in fowls; Myiasis, general; Parasitic Infestation, general; *Pfeifferella mallei* Infection [Glanders], general; Poisoning, plants; Rabies, general, control; Reports; Research Institutes; *Rickettsia* Infection; *Salmonella pullorum* Infection [Bacillary White Diarrhoea], control; Sheep, diseases general; Snake Bite; Stiff Lamb Disease; Stomach worms; *Strongylus*; Swine Fever, general; Ticks; *Trichinella* Infection, general; *Trypanosoma cruzi* Infection [Chagas' Disease].
URINARY SYSTEM. Histological structure of the kidneys and urinary passages of poultry, **300**.
See also Neoplasms, general.
URINE. Processes of urine formation, **138**; secretion in the fowl, **802**; magnesium content in cattle, **48**; sulphur content in cattle, **385**; phenol content in cattle and horses, **299**; indican content in domestic animals, **299**; urine collection in dogs, **474**; examination of urine with Lipp's powder reagents, **63**.
See also Acetonuria; Acidosis; Cystinuria; Haemoglobinuria; Hormones, sex hormones; Myoglobinuria; Porphyrins; Pregnancy, diagnosis; Technique, general; Vitamins, vitamin B_2.
URONIC ACID. Lysozyme in deficiency of, **242**.
URUGUAY. See *Aspergillus* Infection; *Eimeria* Infection [Coccidiosis], in sheep; Helminth Parasites, of sheep; *Isospora* Infection [Coccidiosis]; Mange; Microfilariae; *Mycobacterium tuberculosis* Infection, tuberculin test, Ticks.
USTILAGO. See Poisoning, general.
UTERUS. Hyperplastic endometritis or so-called pyometra in the bitch, **108**.
See also *Brucella* Infection, in cattle; Pregnancy, general.

V

V FACTOR. See Vitamins, vitamin B complex.
VACCINES. Recent advances in vaccine therapy, **528**; the choice of saponins for making saponin vaccines, **104**.
See also Biological Products, general, standardization; Immunization; and under name of specific disease.
VACCINIA. See Pox, in cattle, virus.
VAGINA. Prolapse of vagina in ewes, **276**; pH of vaginal secretions of cows, **392**.
See also Distemper, in dogs; Viruses General, transmission.
VAGINITIS, GRANULAR, 962.
VASCULAR SYSTEM. See Circulatory System.
VENEREAL INFECTIONS. See Genital System, diseases.
VENEZUELA. See Encephalomyelitis, Equine; Helminth Parasites, of swine.
VERMIN CONTROL. Rat virus enquiry report, with a note on the raticidal value of commercial and other chemical poisons, **789**; experiments on rats (*Epimys norvegicus*) with "ratin" and "ratinin", **54**.
VESICULAR DERMATITIS. See Dermatitis, vesicular.
VESICULAR EXANTHEMA. See Exanthema, vesicular.
VESICULAR STOMATITIS. See Stomatitis, Vesicular.
VETERINARY EDUCATION. See Education.
VETERINARY SCIENCE. See Research, general.
VETERINARY SERVICES. See Services, Veterinary.
VIBRIO FOETUS. Recovered from aborted bovine foetuses, **827**.
VIBRION SEPTIQUE. See *Clostridium* General, antitoxins.
VIRUS ABORTION IN MARES. See Abortion.
VIRUSES.
General, 87; text-books, **153**, **419**, **900**; discussion by the Australian and New Zealand Association for the Advancement of Science, 1939, **755**; architecture of viruses, **664**; adsorption of ultravirus, **836**; action of bile salts on viruses, **249**; electrophoresis of animal viruses and their antibodies, **836**; ultraviruses and fluorescence, **94**, **589**; statistical methods for ultraviruses, **920**; sampling errors in the determination of virus density by the dilution method, **920**; permeability of the vaginal mucosa of mice to certain viruses, **506**; stability of viruses and its dependence on pH, **921**; prolonged maintenance of filtrable viruses in the frozen state, **631**; therapeutic value of sulphonated aromatic derivatives in virus diseases, **958**; isolation of bacteria from virus by a serial dilution method, **519**.
See also Neoplasms, causation.
Bird Viruses. See Psittacosis.
Cat Viruses. See Gastro-Enteritis, Feline Infectious; Laryngo-Enteritis, infectious.
Cattle Viruses. A filtrable virus isolated from mastitis cows, **516**.
See also Aujeszky's Disease; Blue Tongue; Catarrh, Bovine Malignant; Foot and Mouth Disease; Pleuropneumonia, Bovine Contagious; Polymyelitis; Pox, in cattle; Rabies; Rinderpest.
Cultivation, 836; propagation of herpes, B, and pseudorabies viruses on the chorio-allantois, **674**; yolk of chick embryo as route of injection, **665**; vital staining of lesions on the chorio-allantois by trypan blue, **884**.
See also under name of virus.
Dog Viruses. See Distemper; Rabies.
Elementary Bodies. Staining E.B.'s of psittacosis, vaccinia, rabies, herpes, Aujeszky's disease, and fowl plague, **301**.
See also Pox, virus.
Fowl Viruses. See Encephalomyelitis, Avian Infectious; Fowl Plague; Laryngotracheitis, avian; Neoplasms, causation; Newcastle Disease; Pox, in birds; Sarcoma, fowl.
Of Fur Animals. See Distemper.
Goat Viruses. See Pox, in goats.
Horse Viruses. Diagnostic, therapeutic, and forensic points of view of virus diseases of equines, **921**.
See also Anaemia, Equine Infectious; Borna Disease; Encephalomyelitis, Equine; Foot and Mouth Disease; Horse-Sickness, African; Influenza; Rabies.
Immunity. See Immunity, to viruses.
Inclusion Bodies. See Pox, virus.
Of Man From Animals. See Dermatitis, contagious pustular; Foot and Mouth Disease; Pox, general; Psittacosis; Rabies.
Nature of, 171, 309; virus activity as a property of some protein molecules, **665**.
Neurotropic. Interdependence of neurotropism and the virulence of testicular tissue in certain ultra-virus infections, **836**.
See also Aujeszky's Disease; Borna Disease; Distemper; Encephalomyelitis; Horse-Sickness, African; Lymphocytic Choriomeningitis; Rabies.
Rabbit Viruses. Cardiac lesions in rabbits produced by virus III, **427**.
See also Fibroma; Myxoma; Pox, virus.
Sheep Viruses. See Agalactia, Contagious; Blue Tongue; Dermatitis, Contagious Pustular; Ecthyma, Contagious; Foot and Mouth Disease; Nairobi Sheep Disease; Rift Valley Fever; Rinderpest, immunization.

VIRUSES [cont'd].
Size of Particles. Direct microscopical measurements of virus bodies, **564**.
See also Agalactia, Contagious ; Foot and Mouth Disease, virus ; Psittacosis.
Swine Viruses. See Aujeszky's Disease ; Foot and Mouth Disease ; Influenza, Swine ; Swine Fever.
Turkey Viruses. See Pox, in birds.
Of Wild Animals. See Foot and Mouth Disease , Rabies.
VITAMINS.
General. The fat-soluble vitamins, **387** ; vitamins in animal nutrition, **48** ; requirements of animals according to size, **455** ; calculating vitamin requirements, **614** ; asymptomatic avitaminoses, **48** ; enzymic efficiency in avitaminosis, **369** ; influence of deficiencies on other diseases, **864** ; nutritional deficiency diseases of poultry, **613** ; of fur-bearing animals, **285**.
See also Nutrition, general.
Vitamin A. Carotene and vitamin A in the nutrition of growing dairy cattle, **544**, **614** ; carotene balance and blood carotene levels in cattle, **544**, **785** ; vitamin A deficiency causing blindness in calves, **456** ; vitamin A in colostrum as a factor in causation of "white scour" in calves, **48** ; effects of an atypical blindness-producing ration upon the vitamin K and C content of calf blood, **869** ; avitaminosis A in swine, **120** ; content of the livers of silver foxes, **613** ; of the livers of healthy dogs, **544** ; vitamin A deficiency in the dog, **286** ; reserve of fur-bearing animals, **865** ; delayed prothrombin clotting time in avitaminosis A of chicks, **49** ; mortality in poultry flocks and vitamin A content of the livers of pullets and hens, **613** ; stomach lesions in rats on deficient diets, **865** ; experimental vascular disease in rats produced by multiple depletions of vitamin A, **200** ; conditions of the tissues which predispose to infection in avitaminosis A, **49** ; difficulty of transformation of carotene into vitamin A in disease, and its use in therapeutics, **199** ; bone and nerve changes in vitamin A deficiency, **197** ; nerve degeneration, **286** ; lysozyme in vitamin A deficiency, **242** ; reciprocal influence of avitaminosis A and intestinal parasitism by protozoa, **546**.
Vitamin B Complex, **370**, **866** ; deficiency in the pig, **49** ; blood picture of affected pigs, **862** ; the water soluble vitamins. VII-XIV, **867-68** ; relation of diet to a type of leg weakness in swine induced by nerve degeneration, **784** ; pellagra in swine (review), **545** ; effect of a pellagra-producing diet on herbivora, **614** ; nicotinic acid content of the blood of mammals, **121** ; research on blacktongue, **200**, **201** ; β-aminopyridine in, **50** ; fractions of liver in, **867** ; V-factor (coenzymes I and II) content of the blacktongue dog, **286** ; effect of nicotinic acid deficiency on coenzyme I content of animal tissue, **456** ; coenzymes I and II in normal and pathological spinal fluids, **974** ; factor W and the vitamin B complex, **786** ; experiments with the filtrate factor, **202** ; differentiation of the rat and chick cermatitis factors from nicotinic acid, **370** ; structure of the chick antidermatitis factor, **121** ; effect of diet on the pantothenic acid content of chick tissues, **786** ; new growth factor required for chicks, **458** ; anaemia in chicks caused by vitamin Bc deficiency, **543** ; deficiency in rats of B_2 vitamins, **956** ; hepatic injury caused by, **50** ; production of liver cirrhosis by, **543** ; of haemorrhagic necrosis of adrenals, **543** ; nutritional gizzard erosion in chicks, **120**, **370**, **955**.
See also Brucella Group, cultivation ; Neoplasms, causation.
Vitamin B_1. Experimental beriberi in silver foxes, **698** ; Chastek's paralysis in silver foxes, **50** ; vitamin B_1 deficiency in the rat, **615** ; pathology of the peripheral nerves in, **615** ; lack of nerve degeneration in uncomplicated vitamin B_1 deficiency of the chick and the rat, **369** ; effect of riboflavin deficiency in the hen upon embryonic development of the chick, **699** ; vitamin B_1 and glycaemia, **956** ; glycaemia in fowls with a vitamin B_1 deficiency, **955** ; second international standard vitamin B_1, **699**.
See also *Brucella* Group, cultivation.
Vitamin B_2. Assay of riboflavin in normal and depleted dogs and rats, **544** ; effect of riboflavin-low diets on nerves, growth, and reproduction in the rat, **287** ; riboflavin requirements of the chicken, **201**, **866** ; riboflavin and curled toe paralysis in chicks, **201**, **287**, **866** ; riboflavin requirements of ducklings, **287**.
Vitamin B_6. Microcytic hypochromic anaemia in puppies on diet deficient in, **202** ; deficiency in rats, **956** ; differentiation of the rat dermatitis factor from nicotinic acid, **370** ; the "cartilage growth factor" and vitamin B_6 in the nutrition of chicks, **202**.
Vitamin C, **545** ; ascorbic acid of the liver and adrenals of some domestic animals, **121** ; of the adrenal gland, crystalline lens, aqueous humour and vitreous humour in cattle, **627** ; of organs of healthy cattle, **287** ; influence of Walker carcinosarcoma on ascorbic acid concentration in various endocrines and organs, **193** ; vitamin C requirements of animals, **616** ; resistance to avitaminosis C, **285** ; the reciprocal influence of avitaminosis C and intestinal parasitism by protozoa, **546** ; effects of an atypical blindness-producing ration on the vitamin C content of calf blood, **869** ; tissue changes in ascorbic acid deficient g. pigs, **545**, **615**.
See also *Mycobacterium tuberculosis*, cultivation ; *Mycobacterium tuberculosis* Infection, immunity, pathogenesis.
Vitamin D, **730** ; requirements of dairy calves, **51** ; individual and breed variations in pigs on rations devoid of, **288** ; magnesium and vitamin D relationships in calves fed mineralized milk, **456** ; effect on growing pigs of different levels of phosphorus in the absence of vitamin D, **541** ; a low phosphorus diet and the response of rats to vitamin D_2, **613** ; influence of vitamin D of animal origin on the antirachitic power of cow's milk, **699** ; relative efficiency in fowls of vitamin D from several sources, **52**, **457** ; curative method with chicks for the assay of vitamin D, **121** ; toxic action, **288** ; hypervitaminosis D in chickens, **51**.
See also Nephritis ; Rickets.
Vitamin E, **405**, **700** ; relationship of tocopherols to the endocrine system, **546** ; effect of decreased vitamin E on reproduction of goats, **546** ; nutritional encephalomalacia in chicks and related fowl disorders, **203** ; muscular dystrophy and vitamin E deficiency in rats, **288**, **289**, **547** ; reduced muscle creatine in paralysed young E-low rats, **202** ; cure and prevention of muscular dystrophies and nervous diseases with wheat-germ oil and α-tocopherol, **458**, **700**, **787** ; feeding wheat-germ oil prepared by ether extraction, **621** ; relation between dosage and response in estimating vitamin E, **787** ; standardization of the rat for bio-assay, **786**.
See also Fowl Paralysis ; Muscles, diseases.
Vitamin K, **547**, **787** ; determination and properties, **122**, **458** ; deficiency of prothrombin : treatment with the antihaemorrhagic vitamin, **289** ; delayed prothrombin clotting time in avitaminosis A and pellagra-like chicks, **49** ; effects of an atypical blindness-producing ration on the vitamin K content of calf blood, **869**.
See also Encephalomalacia.
Vitamin P, **371** ; relation of capillary fragility to the purpuras, **371**.
See also Purpura.
VIVISECTION. Attempt to prohibit vivisection in Basle Canton, Switzerland, **302**.
VOLES. See *Mycobacterium*, general ; *Mycobacterium tuberculosis* Infection, general.

W

WALES. See Great Britain.
WARBLE FLIES. See Oestridae.
WARFARE. The bacteriological weapon in war, **721**.
See also Air Raid Precautions ; Gases, poisonous ; Horses, diseases general ; Services, Veterinary.
WEIL'S DISEASE. See *Leptospira* Infection.
WHEAT-GERM OIL. See Vitamins, vitamin E.
WHITE MUSCLE DISEASE. The stiff lamb problem, with special reference to white muscle disease, **188**.
"WHITE SCOUR". See Diarrhoea.
WILD ANIMALS AND BIRDS. Health of wild animals, **476** ; P.M. examination of dead game animals in Bavaria, **944** ; Canadian arctic wild life enquiry, **603**.
See also Antelopes ; Arthritis ; Chamois ; Deer ; Elands ; Elephants ; Emus ; *Erysipelothrix rhusiopathiae* Infection ; Foot and Mouth Disease, transmission, in wild animals and birds ; Fowls, diseases general ; Foxes ; Fur Animals ; Ground Squirrels ; Grouse ; Hamsters ; Hares ; Helminth Parasites, of wild animals and birds ; Kudus ; Mange ; Mink ; *Mycobacterium tuberculosis* Infection ; Parasitic Infestation, general ; Parrots ; Pheasants ; Poisoning, general, metals metalloids and salts ; Psittacosis ; Rabbits ; Rabies, transmission ; Raccoon Dogs ; Raccoons ; Rats ; Seagulls ; Voles.
WOUNDS. See Antivirus ; Cod Liver Oil ; Gases, poisonous ; Myiasis.

X

X-RAYS. See Eimeria Infection [Coccidiosis], treatment ; Leucosis, avian ; Neoplasms, general ; Sarcoma, fowl ; *Trypanosoma* General, viability.

Y

YAK. See Hybrids.
YUGOSLAVIA. See *Bacterium tularense* Infection [Tularaemia] ; *Brucella* Infection, in cattle, in man [undulant fever], in milk ; Cattle, diseases general ; *Dicrocoelium* ; *Fasciola* ; Helminth Parasites, of fowls ; Horses, diseases general ; *Mycobacterium tuberculosis* Infection, in cattle, tuberculin test ; Parasitic Infestation, general ; *Pasteurella pseudotuberculosis* Infection ; Rabies, control ; Reports ; Snake Bite ; Swine, diseases general ; Ticks ; *Trichomonas* Infection, in cattle.

Z

ZEBU CATTLE. See Cattle.
ZINC. See Poisoning, metals metalloids and salts,
ZOOLOGICAL GARDENS. See *Mycobacterium tuberculosis* Infection, in wild animals and birds ; Poisoning, plants ; Wild Animals and Birds.
ZOOTECHNY. Scope of the word climate and its use in zootechny, **395.**
See also Diseases General, Unspecified, control ; Services, Veterinary.
ZULULAND. See *Glossina.*

ERRATA.

p. 93. SALLES, A. (1937). for "*garrote* [unable to verify species—Ed.]", read "bull calves".
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p. 316. BUZENAC, J. (1939). for "**Staphylococcus Toxin**", read "**Staphylococcus Anatoxin**".
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